

# HORTICULTURAL ABSTRACTS

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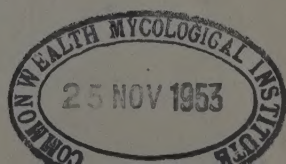
VOLUME XXII



1952

Compiled and issued quarterly since 1931 by the  
COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS  
EAST MALLING, KENT, ENGLAND

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### NOTE ON USE OF SUBJECT INDEX

There are certain innovations in this index to which your attention is urgently drawn.

The chief change likely to cause trouble at first is the rearrangement of subject matter under the major crops. A system of grouping has been adopted whereby interrelated subjects are placed under a common heading. Thus, for example, under the main heading "Apple" all diseases and disorders will be found under the sub-heading "diseases", all pests under "pests", any references to nutrition, manuring or mineral deficiencies under "nutrition" and any soil culture practices such as cover cropping, cultivation, irrigation and weed control under "soil management".

The system has the initial disadvantage that the user must decide on a simple key word, but once that is done it is considered that the following advantages will more than compensate for this:

- Elimination of unnecessary duplication.
- Simplification of actual process of indexing.
- Economy in space and cost.
- Better basis afforded for cumulative indexes.

There are other changes all clearly signposted by cross references.  
Comment would be welcomed.

# COMMONWEALTH BUREAU OF HORTICULTURE AND PLANTATION CROPS

## SCIENTIFIC STAFF, JANUARY, 1952

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## HORTICULTURAL ABSTRACTS

### Cover

Having been bidden to tell the world we abstract their literature, we have walked so delicately that our change in legend may have escaped your notice.

Unlike our skittish young contemporary, Field Crop Abstracts, who flaunts a new primrose gown bedecked with jasper red, or our elderly confrère, Herbage Abstracts, who vainly seeks to belie his age in a sporting grass green one-piece, we maintain our sober purple, only setting out more succinctly than before the goods we have to offer.

### Subject matter. Potatoes and sweet potatoes

In the current year, 1952, potatoes and sweet potatoes will be dealt with both in Horticultural and in Field Crop Abstracts, but as from 1953 they will pass from our care to that of Field Crop Abstracts as being nowadays almost always grown as field crops.

While wishing them well in the hurly-burly of rude agriculture, we shall have more attention to spare for such purely horticultural crops as vines, olives, etc.

### Subscription Rates

Here we come to the really sad part of our tale, for rates must go up as from 1953. Exact figures will be given in our next issue. We hope that readers, realizing that the work put into the perusal of the ever-growing literature and into the compilation, editing, indexing and printing of Horticultural Abstracts, is increasing all the time, will still feel them worth the equivalent of, say, two bottles of Scotch, a visit to the Show, 400 cigarettes, a large box of candies, or even a good new shirt.

### Availability

Copies printed on one side only can be obtained—see p. iii of cover.

### Indexing of Abstracts

Full subject and author indexes are issued for each volume, together with a list of the publications from which abstracts were made and the abbreviations used.

### Journals on closely related subjects

Plant Breeding Abstracts, Herbage Abstracts and Field Crop Abstracts, all issued by the C.A.B., deal respectively with the breeding of annual and perennial crops, with herbage problems and with field crops. Soils and Fertilizers deals with the more fundamental aspects of manuring and soil management.



# HORTICULTURAL ABSTRACTS

Vol. XXII

March 1952

No. 1

Initialled abstracts and reviews not by Bureau staff are by A. E. Bradfield, E. S. J. Hatcher, M. M. Macneill, A. F. Posnette, H. M. Tydeman and M. C. Vyvyan of the East Malling Research Station, the staff of the Obstbauversuchsring, Jork, Germany [O.J.], H. W. Abbiss of the N.A.A.S., C. W. S. Hartley and G. St.C. Feilden.

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## MISCELLANEOUS.

### General.

(See also 1068, 1095, 1122.)

#### 1. AGRICULTURAL RESEARCH COUNCIL [LONDON].

*Index of agricultural research in progress 1951.*

H.M.S.O., London, 1951, pp. 53, 3s. 6d.

The foreword indicates that yearly revision is contemplated. May we hope also for the yearly issue of this most valuable reference work? While the horticulturist will probably find most of what he wants under the Crop index, the specialist may prefer to look under the index headings [abbreviated]: Biochemistry, Entomology, Fertilizers, Insecticides, Plant Breeding, Plant Pathology, Plant Physiology or Weeds.

#### 2. MERCER, W. B.

*British farming.*

[Publ.] *Minist. Agric.*, H.M.S.O., London, 1951, pp. 97, illus., 3s. 6d. (3s. 9d.).

This well-illustrated brochure gives an interesting skeleton account of farming operations in different parts of England, Scotland and Wales. The pages devoted to Market Gardening, 82-91, concern vegetable growing, including glasshouse crops, fruitgrowing and

hops. A list of centres where particular horticultural crops can be seen is usefully included. It would be a most appropriate present for any keen agriculturally-minded visitor from overseas.

#### 3. (SOUTH AUSTRALIA.)

*South Australia, achievements and resources.*

Adelaide, 1950, pp. 69, illus.

The chief interest to the horticulturist in this bulletin lies in the sections devoted to the Wine industry and to Irrigation.

South Australia produces 80% of the wines and 90% of Australian brandies. Brandies, burgundies and clarets are produced in the south (McLaren Vale), while the foothills produce port, hock and moselle types and sparkling wines.

Fifty miles north of Adelaide is the Barossa Valley with 22,000 acres under vines producing the heavier wines. Farther north in the Clare and Watervale districts some of the best light wines are made.

The Irrigation Schemes on the River Murray, particularly those in the Renmark and Loxton areas, afford settlements in which citrus, vines and stone fruit predominate. Further, on the plains between the Mount Lofty Ranges and the sea there are almond

groves which produce 60% of all Australian almonds. On the foothills of the same ranges olives are successfully grown for oil production. To-day South Australia is producing an appreciable part of her vegetable seed requirements. The vegetable producing industry itself is changing gradually to mass production.

#### 4. NEW SOUTH WALES, DEPARTMENT OF AGRICULTURE.

##### **Crop, pasture and fruit breeding in New South Wales 1930-1950.**

*Sci. Bull. Dep. Agric. N.S.W.* 72, 1950, pp. 164, illus.

Here will be found a clear account of the main features and objects of breeding and selection work in agricultural and horticultural crops during the last twenty years in New South Wales. Among horticultural crops to which attention would appear to have been usefully devoted are: castor oil, sunn hemp, tomatoes, potatoes, cabbage and cauliflower, pumpkins, water and rock melons, citrus, papaya, peaches, apricots, apples, and almonds. Experiments in such drug plants as pyrethrum, ephedra, poppy and derris have been abandoned. Citrus declined between 1931 and 1944. Of oranges Valencias and Washington Navel remained steady but others declined, lemons and grapefruit increased, mandarins dropped. Passion fruit has continued to decline as the breeders have as yet been unable to find resistance to woodiness. Cherries—all sweet—have declined by one-third. In pears, Packhams' Triumph is now a close second to Williams in popularity. In apples, Granny Smith and Delicious continue to increase in acreage, while Jonathan declines. The search goes on for scab-resistant types. Among research centres are Bathurst, Hawkesbury College, Yanko, New England, Narara, Leeton.

#### 5. TASMANIA DEPARTMENT OF AGRICULTURE. Information for new settlers.

*Bull. Tasm. Dep. Agric.* 29, [1950 ?], pp. 63, illus.

In 1948/49 there were in Tasmania approximately 31,000 acres under orchards, viz. fruits and hops, 193,000 acres under farm crops, 713,000 in improved pastures and 5,700,000 acres in native pasture and bush devoted to grazing. High rainfall and a rigorous climate preclude agricultural development in the unoccupied land of the south-west. Details are given of every kind of agricultural industry in Tasmania, whose climate is comparable with that of the South Island of New Zealand, i.e. essentially temperate. Enquiries are invited by the Agent General for Tasmania, 457 Strand, London, England, or by the Director, Tasmanian Government Tourist and Immigration Department, Hobart, Tasmania. This bulletin is worth having for the map and illustrations alone.

#### 6. WOODS, J. J.

##### **A review of experimental work at the Dominion Experimental Station, Saanichton, B.C., 1950.**

*Mimeo. Saanichton Domin. exp. Stat.* 115, 1950, pp. 15.

Government bought the land, 120 acres, in 1912 and the first station buildings went up at Saanichton in 1915. In this account of development recent meteorological

records are given [which to an outsider stress the mildness of the climate] and are followed by notes on the following, among other, activities of the station: *Fruit*. Largely selection work on top and small fruits. *Bulbs*. All problems which confront a young bulb industry under conditions which favour the production of first-class bulbs. Tulips, daffodils, iris and hyacinths have been the chief objects of investigations which concern not only cultivation but also flower transport problems. *Flower and vegetable seed production*. Since 1928 one of the main tasks of the station's Vegetable Division has been the development and maintenance of foundation stock seed.

#### 7. WOODS, J. J.

##### **Experimental work for 1950 at the Dominion Experimental Station, Saanichton, B.C.**

*Mimeo. Saanichton Domin. exp. Stat.* 116, 1950, pp. 13.

An account, not results, of work in progress at Saanichton. Among projects most interesting to horticulturists are those which cover the following: Strawberry manuring; rotations to include small fruits, bulbs, vegetable seed crops and early potatoes; organic mulching of all kinds of horticultural crops; breeding of strawberries and logans; variety tests of blueberries, blackberries, currants, gooseberries, European and American grapes, raspberries; the effect of altitude on pear production; cultivation trials of apple varieties on EM IX rootstock, part under irrigation; selection of vegetable seed for foundation stock; bulb treatment to influence growth and early flowering; optimum irrigation treatments for horticultural crops; different types of heating and lighting for plant houses.

#### 8. DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH, N.Z.

##### **Scientific Institutions in New Zealand.** D.S.I.R., 111 Sydney Street, Wellington, 1949 [received 1951].

A most useful and interesting publication. Agriculture is prominently represented.

#### 9. BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY.

##### **Western Regional Research Laboratory.**

*A.I.C. Bur. agric. ind. Chem., Agric. Res. Administ.*, 237, 1949, pp. 10 [received 1951].

This laboratory at 800 Buchanan Street, Albany 6, California, deals with fruit and vegetable processing, including canning and deep freezing. Notes are included on the following research units: Enzyme Research Division, and Pharmacology Laboratory at Albany, Fruit and Vegetable Products Laboratory at Washington State College, Pullman, and U.S. Natural Rubber Research Station at Salinas, California.

#### 10. MORETTINI, A.

La deficienza dell'organizzazione sperimentale e didattica dell'ortoflorofrutticoltura in Italia. (The lack of adequate provision for horticultural research and education in Italy.)

*Riv. Ortoflorofruttic. ital.*, 1951, 35: 145-51.

The author, speaking with the authority of one who has long adorned Italian horticulture, deprecates the lack of support given to it by the government. To the outsider it is interesting to note where investigational



and educative work is in progress. The existing research establishments mentioned by the author are: (1) The Experimental Station for citrus and other fruit culture at Acireale in Sicily, (2) The Fruit Station attached to the Institute of Tree Culture of the Faculty of Agriculture at Milan, (3) The Floricultural Station of San Remo, (4) The Institute of Fruitgrowing and Electrogenetics of Rome [at Grotta rossa], and (5) The Centre for Horticultural Plant Improvement of the National Research Council attached to the Institute of Tree Culture of the Florence Faculty of Agriculture and Forests. As regards specialized horticultural instruction the author mentions only three institutions which provide it. These are the Technical Agricultural School of S. Ilario Ligure and the two Technical Agricultural Institutes of Florence and Ponticelli (Naples) which provide a one-year horticultural course for graduate agricultural scientists. The author considers that the equipment and personnel of the establishments at S. Ilario and Ponticelli are inadequate while the course at Florence, despite adequate equipment, is little patronized.

11. BLETON, —.  
Le Maroc agricole. (Agriculture in Morocco.)  
*Terre maroc.*, 1951, 25: 253-9.

Only one-fifth of the total area of Morocco is at present cultivated, and of this only a small proportion is in the hands of European colonists. Data are given on the relative importance of the various crops grown, their export value and the areas of production. Of the fruit crops, citrus and vines are grown mainly by the Europeans, olives, almonds, figs, apricots and dates mainly by the natives using very primitive methods. Vegetables, especially early crops of tomatoes and potatoes, are important export products. Since the war the production of safflower and sunflower crops for oil has increased rapidly.

12. DE FINA, A. L., AND GARBOSKY, A. J.  
Causas de la difusión geográfica de frutales en la Mesopotamia Argentina. (Reasons for the geographical distribution of fruit trees in the Mesopotamia district of Argentina.)  
*Rev. argent. Agron. B. Aires*, 1951, 18: 147-53.

In 1945 an agroecological survey of Mesopotamia, Argentina, was made by the Institute of Soils and Agrotechnology by a method based on observations on the performance (or absence) of a series of 18 indicator plants. The indicator plants comprised 12 perennials (cacao, pineapple, banana, lemon, date, olive, fig, vine, walnut, peach, pear and apple) and 6 annuals. In this paper the observations made on the effect of climatic factors on the distribution of the 12 perennial plants are summarized. The amount of winter cold was found to be the most important factor.

13. ANON.  
Marketing—will this be the way?  
*Fruitgrower*, 1951, No. 2907, pp. 428-30, illus.

It is suggested that the type of public auction for fruit and vegetables, recently set up in Hampshire and here described, may provide a pattern for the Government

sponsored experimental markets in the U.K. The freshly harvested produce is brought into the sales warehouse by the growers on lorries of the organization during the afternoon, it is sold in the evening and is in retail shops next morning. The costs are low and overhead charges could be further reduced by an increase in volume of business.

14. PURI, V.  
The role of floral anatomy in the solution of morphological problems.  
*Bot. Rev.*, 1951, 17: 471-552, bibl. 492.

This is an extensive review of anatomical work on the flower, and of the use that has been made of the study of the arrangement and disposition of vascular bundles in the interpretation of variations in the external form of the flower. Typical flower vascular bundles are first discussed and this is followed by a description of modifications by reduction, cohesion and adnation. In a discussion of the nature of vascular bundles it is concluded that, in the flower, the doctrine of conservative organs is meaningless and that the bundles do not trespass morphological boundaries. This latter characteristic makes the bundles useful for interpreting the flower structure. Flower parts are discussed in detail. Examples are given from many natural orders, but particular attention is paid to the crucifer gynaecium.  
C.W.S.H.

15. BURKART, A.  
Proposición de tres términos de índoles biológica y agronómica. (Three new terms of biological and agronomic significance.)  
*Lilloa*, 1949, 19: 71-3, from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 1175.

The following three additions to Spanish botanical terminology are proposed. Anfistemonia, an English version of which would be amphistemonia, indicates the simultaneous incidence of inflorescences bearing haplostemonous and diplostemonous flowers, a condition observed in some spp. of *Mimosa*. Homosis indicates the genotypical condition which is the reverse of heterosis, results from inbreeding and produces loss of vigour or degeneration and progressive sterility. The term must not be confused with homoeosis. Semillón is the Spanish equivalent, hitherto lacking, for the English word "seedling". The first two words proposed are to be incorporated in the botanical dictionary now in course of preparation by P. Font Quer of Barcelona, Spain.—Univ. La Plata, Argentina.

### Biochemistry.

(See also 97u, 1055.)

16. HOURQUEBIE, H., AND OTHERS.  
Primera contribución a la bibliografía fitoquímica argentina. (First contribution to the bibliography of plant chemistry in Argentina.)  
*Lilloa*, 1949, 18: 5-70, from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 1176.

This valuable list of approximately 1,000 references to the literature includes material available in European and North American publications, as well as that which has appeared in South America.



## 17. COUTO, M. E.

Primera contribución a la bibliografía fitoquímica del Uruguay. (First contribution to the bibliography of plant chemistry in Uruguay.) [English summary.]

*Lilloa*, 1949, 18: 77-80, from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 1177.

A preliminary list is given of 20 references to literature published in Uruguay on the chemistry of that country's plants.

18. WEEKS, D. C., AND ROBERTSON, R. N.  
Studies in the metabolism of plant cells.  
VIII. Dependence of salt accumulation and salt respiration upon the cytochrome system.  
*Aust. J. sci. Res., Ser. B, biol. Sci.*, 1950, 3: 487-500.

It has been established with the use of the enzyme-inhibitor carbon monoxide that the cyanide-sensitive salt respiration in carrot root cells is mediated by the cytochrome-cytochrome oxidase system. The cyanide-stable ground respiration is not mediated by the cytochrome-cytochrome oxidase system. The cyanide-sensitive process of ion accumulation in carrot root cells is reversibly inhibited by carbon monoxide in exactly the same way as is the salt respiration, and is thus also closely dependent on the activity of the cytochrome-cytochrome oxidase system. This work thus establishes the validity of the previous assumptions that cyanide inhibition of these processes was due to inhibition of the cytochrome-cytochrome oxidase system. [Authors' summary.]

19. OSIPOVA, O. P., AND TIMOFEEVA, I. V.  
The effect of nitrogen nutrition and illumination on the chemical composition of chloroplasts. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 449-51.

In experiments with beans (*Phaseolus*) it was found that by altering the amount of nitrogen fertilizer and of light the chemical composition of the chloroplasts was altered, resulting in a modification of the growth, development, and metabolism of the plant.

## 20. BHAGVAT, K., AND HILL, R.

Cytochrome oxidase in higher plants.

*New Phytol.*, 1951, 50: 112-20, bibl. 20.

A preparation from tissues of various cereals and vegetables has been obtained showing the complete cytochrome system. The cytochrome is associated with cytochrome oxidase and succinic dehydrogenase.

## 21. PRICE, C. A., AND THIMANN, K. V.

The succinic dehydrogenase of seedlings.

*Arch. Biochem. Biophys.*, 1951, 33: 170-1, bibl. 7.

The presence of the enzyme was readily demonstrated in oat and pea seedlings.

## 22. BOKUČAVA, M. A., POPOV, V. R., AND ŠUBERT, T. A.

The role of tannins in the oxidation-reduction processes of plants. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 439-42, bibl. 11.

Experiments show that tea tannins are able to perform the role of hydrogen carriers in the fermenting oxidizing

system. This puts the tea tannins in the category of Palladin's "chromogens"; they have an important physiological role.

## 23. ŠTERNBERG, M. B.

Features of the growth-formation processes in inclined shoots. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 507-10.

The differences in morphology and chemical content of leaves of the physiological upper and lower sides of inclined branches of tung, mulberry and maple are described. The leaves of the lower side are greater in size and weight, and contain more proteids, soluble carbohydrates and starch, than those on the upper side. In maple the leaves of the two sides have the same form, in tung there is lobing of the lower leaves and in mulberry of the upper leaves.

## Physiology.

(See also 1056, 1058.)

## 24. McAULAY, A. L., FORD, J. M., AND HOPE, A. B.

The distribution of electromotive forces in the neighbourhood of apical meristems.

*J. exp. Biol.*, 1951, 28: 320-31, bibl. 6.

1. A research project is described using different methods of experiment on two contrasted types of apical meristems with the object of measuring the permanent electrical field inside and outside the plant in the neighbourhood of the apical meristem under conditions of specified control. 2. Most of the experiments were performed on 3- to 5-day-old maize seedling roots and turnip seedling hypocotyls. The general results were checked by experiments with other plants. 3. The measured p.d. is a result of e.m.f.s which are unchanged when supplying current of the order of  $10^{-8}$  amp. through external conductors. Both turnip hypocotyls and sections of couch grass stems generate power of the order of  $10^{-9}$  W. without polarizing. In these experiments the equivalent resistance of the plant materials obeyed Ohm's law. 4. The average potential gradient along the surface of 34 turnip hypocotyls in the neighbourhood of the apical meristems was found to be  $7.1 \pm 3.8$  mV./mm. (over 6-8 mm.). The surface of the meristematic region is positive to that of older tissue. The corresponding average for 25 maize roots was  $5.7 \pm 2.4$  mV./mm. (over 6-8 mm.). 5. There are transverse e.m.f.s between the outside and inside of the plants distributed radially from the stele to the root exodermis and hypocotyl epidermis. The inside is always negative with respect to the outside. The radial e.m.f. is larger in the meristematic region than elsewhere. There is a small but possibly not significant potential change along the axis in both the organs considered, possibly 1 mV./mm. Under the conditions of the experiment, the interior of the meristem was found to be negative with respect to the rest of the axis. 6. The theory that the interior of a mass of meristematic tissue is electrically negative to older tissue is discussed in the light of the experimental evidence and with regard to the limitations of the technique used. [From authors' summary.]—Univ. Tasmania, Hobart.



25. BLACKMAN, G. E., AND WILSON, G. L. Physiological and ecological studies in the analysis of plant environment. VII. An analysis of the differential effects of light intensity on the net assimilation rate, leaf-area ratio, and relative growth rate of different species.

*Ann. Bot. Lond.*, 1951, 15: 373-408, bibl. 24.

Two species with shady habitats, *Geum urbanum* and *Solanum dulcamara*, and eight from open situations, *Helianthus annuus*, *Hordeum vulgare*, *Vicia faba*, *Pisum sativum*, *Fagopyrum esculentum*, *Lycopersicon esculentum*, *Tropaeolum majus*, *Trifolium subterraneum*, were used in these experiments. It was concluded that, as relative growth rate is the product of net assimilation rate and leaf-area ratio, then, if the effect of shading on assimilation and on leaf-area ratio can be expressed mathematically, the relationship between light intensity and relative growth rate can be determined. The experiments showed a linear relationship between the logarithm of light intensity and both leaf-area ratio and net assimilation rate for all ten species. The relation between the logarithm of light intensity and relative growth rate is therefore curvilinear. The intensities at which growth rate is maximal varied between species, and are accounted for in terms of differences in leaf-area ratio at different light levels. It is suggested that a shade plant is best redefined as a species in which reduction of light intensity causes a rapid rise in leaf-area ratio from a low value in full daylight. C.W.S.H.

26. SPANNER, D. C., AND HEATH, O. V. S. Experimental studies of the relation between carbon assimilation and stomatal movement. II. The use of the resistance porometer in estimating stomatal aperture and diffusive resistance.

*Ann. Bot. Lond.*, 1951, 15: 319-33, bibl. 14.

Theoretical considerations on the use of the resistance porometer are discussed. Two physical sources of error in the resistance porometer as ordinarily used were considered to be of importance. *Pelargonium* and wheat leaves were used in trials in which modifications were devised to deal with these sources of error. C.W.S.H.

27. SCARTH, G. W., AND SHAW, M. Stomatal movement and photosynthesis in *pelargonium*. II. Effects of water deficit and of chloroform: photosynthesis in guard cells.

*Plant Physiol.*, 1951, 26: 581-97, bibl. 15, illus., being *Contr. Fac. Agric. McGill Univ. Quebec, J. Ser.* 284.

In *pelargonium* stomatal closure when induced by mild water deficit or by non-toxic concentrations of chloroform is preceded by inhibition of photosynthesis and may be largely prevented by CO<sub>2</sub>-free air. More severe wilting causes passive closure, which is not prevented by absence of CO<sub>2</sub>. The guard cells appear to be capable of photosynthesis. The results, including those presented in a previous paper [see *H.A.*, 21: 3167], confirm that the effect of light on stomatal opening depends on photosynthesis and, mainly at least, on reduction of CO<sub>2</sub> concentration in the leaf. [Authors' summary.]

28. VAN DER VEEN, R. Fluorescence and induction phenomena in photosynthesis.

*Phytol. Plant.*, 1951, 4: 486-94, bibl. 7.

Leaves of *Hibiscus rosa sinensis*, dahlia and tomato were included in the trials carried out at the Philips Research Laboratories, Eindhoven, Netherlands.

29. BENNET-CLARK, T. A., AND BALL, N. G. The diageotropic behaviour of rhizomes.

*J. exp. Bot.*, 1951, 2: 169-203, bibl. 23, illus.

The geotropic behaviour of rhizomes was investigated by time-lapse photographic recording using infra-red radiation in complete absence of light. Rhizomes of bishop's weed, *Aegopodium podagraria*, were used.—King's Coll. Univ. London.

30. RINGWALD, F.

Betrachtungen zum Problem der künstlichen Pflanzenbelichtung. (Observations on artificial illumination of plants.)

*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 9, pp. 3.

A general discussion on artificial illumination with long-day, short-day and day-neutral ornamental plants listed.

31. INGRAM, M., AND RICHES, J. P. R.

The preparation of sterile carrot discs for prolonged physiological experiments.

*New Phytol.*, 1951, 50: 76-83, bibl. 11, illus.

A method described for cutting carrot slices, and transferring them to experimental vessels, aseptically, allows prolonged studies of respiration under sterile conditions.

32. SWANSON, C. A., AND BÖHNING, R. H.

The effect of petiole temperature on the translocation of carbohydrates from bean leaves.

*Plant Physiol.*, 1951, 26: 557-64, bibl. 8, illus., being *Pap. Dep. Bot. Plant Path., Ohio St. Univ.* 529.

Rate of carbohydrate transport in *Phaseolus vulgaris* was measured in terms of rate of elongation of the stem and first trifoliate leaf. Only the temperature of the petiole was varied, the other parts of the plants being maintained at 20 ± 1° C. Growth during the experimental period occurred in complete darkness, sucrose being supplied to the plants by immersion of the blade of the temperature-treated leaf in 0.75 molar sucrose solution. "Maximum sucrose transport occurred at petiole temperatures in the range of 20 to 30° C. At petiole temperatures of 5 to 7.5° C., and 40 to 42° C., rate of transport was reduced as much as 50% and 100% respectively, compared with controls. At 20° C. petiole temperature, the rate of elongation of either stem or leaf remained essentially constant throughout the experimental period (135 hours maximum). At lower temperatures, the retarding effect on translocation progressively decreased with time; at higher temperatures, progressively increased."

33. BREAZEALE, E. L., MCGEORGE, W. T., AND BREAZEALE, J. F.

Water absorption and transpiration by leaves. *Soil Sci.*, 1951, 72: 239-44, bibl. 6.



In experiments with tomato plants and corn seedlings water absorption and transpiration were measured quantitatively under varying degrees of humidity and fogging.

34. MYERS, G. M. P.

The water permeability of unplasmolysed tissues.

*J. exp. Bot.*, 1951, 2: 129-44, bibl. 22.

1. The permeability of unplasmolysed cells of beet-root, variety Crimson Globe, was determined from the rate of water loss of beet slices on placing in sucrose solutions having O.P. greater than the suction pressure of the beet. The absolute values obtained were about  $0.7\mu^3$  water per  $\mu^2$  cell-surface per hour per atmosphere osmotic pressure difference, i.e.  $0.7\mu/\text{hr./atm.}$  2. The permeability of similar beet cells plasmolysed within their cell walls was found to be about  $13\mu/\text{hr./atm.}$  3. The permeability of beet cells which had been plasmolysed and allowed to recover was shown to be approximately the same as that of unplasmolysed cells. 4. The hypothesis is advanced that the increase in water permeability on plasmolysis is due to those parts of the plasma-membrane which had formerly been pressed against the micelles of the cell wall becoming free and able to take part in water transfer. 5. The energy requirement for the maintenance of an excess hydrostatic pressure of five atmospheres within a cell by its vital activity was shown to be about one-tenth of the total respiratory energy released in freshly cut beet slices. [Author's summary.]—King's Coll., Univ. London.

35. SPANNER, D. C.

The Peltier effect and its use in the measurement of suction pressure.

*J. exp. Bot.*, 1951, 2: 145-68, bibl. 10, illus.

A method is described by means of which the suction pressure of living material may be measured by observations on its equilibrium vapour pressure. The method possesses the advantages of giving the suction pressure by direct observation rather than by interpolation; of speed in the actual measurement; of not subjecting the tissue to immersion; and of permitting organs like leaves, otherwise difficult to handle, to be easily dealt with. It also opens possibilities outside the range of the conventional methods. [From author's summary.]—Imp. Coll. Sci. Technol., London.

36. GAWADI, A. G.

Blattfall und die sogenannte Trennschicht.  
(Leaf fall and the so-called abscission layer.)

*Ber. wissenschaftl. Biol.*, 1951, 71: 70.

Dusting the leaves with ammonium thiocyanate or treating the whole plant with gaseous carbon tetrachloride or ethylene chlorohydrin caused premature leaf fall. It is suggested that the leaf fall is the result of the loss of equilibrium between hormone formation and ethylene production. O.J.

37. CARNS, H. R., ADDICOTT, F. T., AND LYNCH, R. S.

Some effects of water and oxygen on abscission *in vitro*.

*Plant Physiol.*, 1951, 26: 629-30, bibl. 3.

The possibility of a relationship between restriction of oxygen supply and inhibition of abscission was investigated in a series of experiments with explants of Black Valentine bean [for method see H.A., 19: 2665]. The explants, either submerged in distilled water or placed in a desiccator, were supplied with gas mixtures containing various proportions of oxygen. An increase in the rate of abscission occurred with each increase in oxygen level up to 40% in the desiccator and 55% in water. At any given oxygen level below 55% the explants in water had a lower rate of abscission than did the explants in the desiccators.—Univ. Calif., Los Angeles.

38. LOBOV, M. F.

The relation between growth and the concentration of cell sap in plants. [Russian.]

*Bot. Zhurnal*, 1951, 36: 21-8, bibl. 38.

The subject is discussed in general terms and then data are given for potato, tomato and two varieties of cabbage. It is concluded that, with cell sap at a concentration greater than 8 atmospheres, growth processes are checked and this is associated with diminished yield.

39. KARMANOV, V. G.

The effect of the intensity of radiation and the temperature of the air on the temperature of plant leaves. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 913-15.

A self-recording galvanometer (pyrometer) was used for the estimation of the difference between the temperature of the surrounding air and that of leaf tissues. Results are recorded as graphs for lemon and tomato leaves with air temperatures of  $+18^\circ$  and  $-6^\circ$  C. Results are mentioned for radish also. Differences of the order of  $20^\circ$  are recorded.

40. GENKELJ, P. A., AND MARGOLINA, K. P.

The viscosity of protoplasm and the heat resistance of the vegetative and sexual organs of plants. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 587-90, bibl. 8.

From an examination of cereals, potato, vetch, cucumber and sunflower it is concluded that there is close connexion between the viscosity and elasticity of the protoplasm of plants and resistance to heat and drought.

*Polyploidizing agents.*

(See also 739, 780.)

41. BERGER, C. A., AND WITKUS, E. R.

Some cytological effects of cortisone.

*Bull. Torrey bot. Club.*, 1951, 78: 422-5, bibl. 2

The cytological effects of cortisone acetate on *Allium* have been observed and are here described. Tetraploidy is induced not by C-mitosis or a process similar to that induced by naphthaleneacetic acid, but by the localized induction of a double chromosome reproduction in the resting nuclei of certain groups of cells.



**Growth substances.**

(See also 80, 97f, w, x, y, z, 183-189, 266, 419, 420, 431-433, 437-440, 442, 443, 448-452, 453c, f, g, 612, 613, 627, 631o, 654, 658-661, 666, 669, 881, 882, 952, 1069.)

## 42. WEINTRAUB, R. L., AND OTHERS.

**A method for measurement of cell-elongation-promoting activity of plant growth-regulators.**  
*Amer. J. Bot.*, 1951, 38: 435-40, bibl. 29, illus.

The method makes use of the curvature response of a decapitated, semi-etiolated bean hypocotyl to unilateral presentation of growth-regulator. A unique feature is the application of a small drop of alcoholic solution of the test substance to the region of elongating cells, which results in the rapid entry of a known dose and virtually eliminates longitudinal transport as an influential factor. [From authors' summary.]—Camp Detrick, Frederick, Md.

## 43. SAUBERT-V. HAUSEN, S.

**On the role of growth substances in higher plants.**

*Physiol. Plant.*, 1948, 1: 84-94, bibl. 14 [received 1951].

The author describes her pea culture technique in which cotyledons were removed from just germinated pea seedlings growing in test tubes in the light and the seedlings subsequently grown in nutrient solution plus growth substances. The effects of vitamins B complex, B<sub>1</sub>, C and biotin were observed. Additional growth response was obtained but it was not found possible to produce normal plants. Most of the agents used showed growth-promoting capacity, especially vitamin C, and this was the only one to cause flowering in cotyledonless plants.

## 44. MILLER, I. H., JR., AND BURRIS, R. H.

**Effect of plant growth substances upon oxidation of ascorbic and glycolic acids by cell-free enzymes from barley.**

*Amer. J. Bot.*, 1951, 38: 547-9, bibl. 6.

The data obtained are compatible with the hypothesis that herbicidal action of growth substances arises from the inhibition of respiratory enzymes, but they do not explain the differential effect of certain herbicides on mono- and dicotyledonous plants.

## 45. WAGENKNECHT, A. C., AND OTHERS.

**Plant growth substances and the activity of cell-free respiratory enzymes.**

*Amer. J. Bot.*, 1951, 38: 550-4, bibl. 13.

Tests of a number of substrates showed that the oxygen uptake by crude bean-leaf juice was stimulated by added lactic, glycolic and ascorbic acids and somewhat by catechol. At concentrations of 0.0005-0.0125 M, 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), 2-methyl-4-chlorophenoxyacetic acid (MCP), alpha-naphthaleneacetic acid (NAA), indole-3-acetic acid (IAA), indole-3-propionic acid (IPA), and indole-3-butyric acid (IBA) did not stimulate the oxygen uptake of bean leaf juice on glycolic acid; the highest concentration of growth regulators inhibited uptake of oxygen only 4-16%. The growth substances had no appreciable influence on the uptake of oxygen without added substrate. Oxidation of ascorbic acid by bean leaf juice was inhibited

24% and 37% by 0.0125 M concentrations of 2,4 5-T and MCP respectively. No concentrations of the substances used stimulated ascorbic acid oxidase. Glycolic acid dehydrogenase was absent from bean root juice. Ascorbic acid oxidase was inhibited 5-23% by 0.0125 M concentrations of 2,4-D, NAA, IAA, IPA and IBA. Respiration without added substrate was inhibited by 2,4-D and NAA, but IAA, IPA and IBA were oxidized and distinctly stimulated the uptake of oxygen. [Authors' summary.]—Univ. Wisconsin.

## 46. FERRI, M. G.

**Nuevas informaciones sobre la influencia de sustancias de crecimiento en el movimiento de las articulaciones de las hojas primarias de *Phaseolus vulgaris* L. (Further information on the effect of growth substances on the movement of the pulvini of the primary leaves of bean plants.)** [English summary  $\frac{1}{2}$  p.]

*Phyton*, 1951, 1: 1: 13-27, bibl. 5, illus.

Segments of 2- to 4-week-old bean plants (*Phaseolus vulgaris*), consisting of the petioles of the 2 primary leaves and a small portion of the stem, were placed in petri dishes containing either water or an aqueous solution of growth substance. The growth substances used were indoleacetic acid, ortho- and para-chlorophenoxyacetic acids, 2,4-dichlorophenoxyacetic acid and  $\beta$ -naphthoxyacetic acid, all at a concentration of 25 mg./l. Twelve concentrations of IAA ranging from 0.049 mg./l. to 100 mg./l. were also tested. In the water-treated controls the angle between the petioles increased, whereas with all the growth substance treatments it decreased. All the compounds tested showed about the same degree of activity. Data are presented on the rate of reaction and on the effect of time of day at which the experiment is carried out.

## 47. TANG, Y. W.

**The effect of indoleacetic acid upon the early growth of *Phaseolus* seedlings in dark and in light.**

*Bot. Bull. Acad. Sinica*, 1949, 3: 178-86, bibl. 12, from abstr. in *Field Crop Abstr.*, 1950, Vol. 3, abstr. 1520.

The elongation of green hypocotyls of *Phaseolus* seedlings in light was accelerated by the addition of various concentrations of indoleacetic acid, but elongation of etiolated hypocotyls in the dark was inhibited. The development of the primary leaf and first internode of both green and etiolated bean plants was checked by the application of indoleacetic acid in spite of light conditions. Thickening of hypocotyls and especially etiolated hypocotyls occurred in the presence of indoleacetic acid. Dry weight per unit length of treated hypocotyls was greater than that of control plants. The effect of indoleacetic acid on the elongation of green hypocotyls in dark and etiolated hypocotyls in light was less significant. [From author's summary.]

## 48. MILLER, C. O., AND MEYER, B. S.

**Expansion of *Chenopodium album* leaf disks as affected by coumarin.**

*Plant Physiol.*, 1951, 26: 631-3, bibl. 8, being *Pap. Dep. Bot. Ohio St. Univ.* 524.

The growth inhibitor coumarin, at concentrations

ranging from 1 to 200 p.p.m., increased the expansion of *Chenopodium album* leaf disks floating on a basic solution of D-glucose and  $\text{KNO}_3$ . A coumarin effect, though small, was obtained when either D-glucose or  $\text{KNO}_3$  was omitted from the medium. Thus the action of coumarin is not merely to increase permeability to glucose or  $\text{KNO}_3$ .

### Radioactive materials.

#### 49. ANON.

Atomic energy glasshouse for radioactive plant research.

*Fruitgrower*, 1951, No. 2902, pp. 215-16, illus.

A brief description is given of a specially designed greenhouse at the Plant Industry Station, Beltsville, Maryland, U.S., for research in plants and soils with radioactive isotopes. It is located on a 2-acre fenced-in plot, providing space for outdoor work as well. Work with radioactive phosphorus has been in progress for the past 3 years and is being extended now to include other radioactive elements such as calcium, zinc and sulphur.

#### 50. FANG, S. C., AND OTHERS.

The absorption of radioactive 2,4-dichlorophenoxyacetic acid and the translocation of  $\text{C}^{14}$  by bean plants.

*Arch. Biochem. Biophys.*, 1951, 32: 249-55, bibl. 7.

Fully expanded primary leaves of *Phaseolus vulgaris* were treated with radioactive 2,4-D by applying the latter in alcohol solution along the midrib. Radioactivity was found in other parts of the plant as early as 2 hours after treatment, and the greatest amount accumulated in the stem and increased with time. Young plants absorbed more quickly than older plants. Absorption of 2,4-D and translocation of  $\text{C}^{14}$  did not depend on the amount supplied above 50  $\mu\text{g}$ . Some 2,4-D was metabolized. C.W.S.H.

#### 51. WICK, A. N., BLACKWELL, M. E., AND HILLYARD, N.

Biosynthesis of radioactive sugars using cantaloupe leaves.

*Arch. Biochem. Biophys.*, 1951, 32: 274-7, bibl. 6.

*Cucumis melo* leaves, 3-4 in. in length, were used for preparing  $\text{C}^{14}$ -labelled glucose. Four photosynthetic chambers were used with  $\frac{1}{2}$  mc. of  $\text{C}^{14}$ , 0.5 g.  $\text{BaCO}_3$ , and 2 leaves in each. C.W.S.H.

#### 52. GIBBS, M.

The position of  $\text{C}^{14}$  in sunflower leaf metabolites after exposure of leaves to short period photosynthesis and darkness in an atmosphere of  $\text{C}^{14}\text{O}_2$ .

*Plant Physiol.*, 1951, 26: 549-56, bibl. 11.

Detached sunflower leaves were allowed to photosynthesize in strong light for a short period in an atmosphere of  $\text{C}^{14}\text{O}_2$ , after which the carbohydrates (sucrose, glucose, fructose, dextrin, and starch), alanine, and malic acid were isolated and the location of the  $\text{C}^{14}$  was determined. The same compounds were isolated and degraded from leaves which had been

exposed to  $\text{C}^{14}\text{O}_2$  in darkness. 1. In the photosynthesis experiments: (a) the monosaccharides contained no label, (b) dextrin approached uniform distribution of carbon more rapidly than the other substances, (c) the labelling of alanine was similar to that of sucrose, (d) malic acid remained predominantly carboxyl labelled during all exposures. 2. In the dark experiments: (a) of the carbohydrates, glucose, fructose, and sucrose, only the sucrose contained label. When the sucrose was inverted and degraded, the invert sugar was labelled only in carbon atoms 3 and 4, (b) the alanine and malic acid were labelled only in the carboxyl carbon. 3. The data indicate that before label can occur in positions other than carbon atoms 3 and 4 of sugar and the carboxyl carbon of amino acids and organic acids, light is necessary to initiate the cycle which synthesizes the  $\text{C}_2$  acceptor. [Author's summary.]—Brookhaven nat. Lab., N.Y.

#### 53. MILLIKAN, C. R.

Radio-autographs of manganese in plants.

*Aust. J. sci. Res., Ser. B, biol. Sci.*, 1951, 4: 28-40, bibl. 13, illus.

When flax, pea, cabbage and tomato plants were grown in nutrient solutions containing radioactive manganese (0.035 mc. of  $\text{Mn}^{54}$ ) there was an accumulation of manganese in the older tissues and in marginal and distal interveinal portions of the leaves. Manganese distribution was similar to that of molybdenum. Addition of molybdenum led to a more even distribution of manganese. Onset of necrosis was associated with accumulation of manganese in the tissues concerned, but as necrosis became complete there was a withdrawal of manganese from the tissues. The movement of manganese into the veins as the plant dries out is discussed in its relation to possible limitations of the radio-autograph technique. C.W.S.H.

#### 54. COLWELL, R. N.

The use of radioactive isotopes in determining spore distribution patterns.

*Amer. J. Bot.*, 1951, 38: 511-23, bibl. 15, illus.

A technique is described by which detailed information may be obtained on the distribution pattern of such airborne particles as fungus spores, pollen grains and agricultural dusts and sprays by the use of radioactive tracers. The experiments reported here were made with conifer pollen grains, but other experiments made concurrently indicate that the technique may be adapted to a wide variety of problems.—Univ. Calif.

### Seeds and seed treatment.

(See also 83, 91, 461-465, 602, 695, 696.)

#### 55. MUNN, M. T., AND BUCHHOLZ, A. B.

The quality of seeds on sale in New York in 1950.

*Bull. N.Y. St. agric. Exp. Stat.* 746, 1951, pp. 80, illus.

In all 2,823 seed inspections were made by the inspectors of the Bureau of Plant Industry of the State Department of Agriculture and Markets. Agricultural seeds showed an improvement over the previous year, flower and vegetable seeds were slightly better, lawn seed mixtures showed the highest percentage of

irregularities, and ornamental tree and shrub seeds offered for sale by one merchant were useless. Tabulated results for germination, field performance and honesty of labelling, with names of firms marketing the seed, are presented. A new problem has arisen, namely that of testing coated or pelleted vegetable and flower seeds, since field results with a few pelleted flower seeds did not substantiate some of the claims made on the packets.

56. MINISTRY OF AGRICULTURE, LONDON.

**Threshing and conditioning of herbage, root, and vegetable seed crops.**

*Bull. Minist. Agric. Lond.* **130**, 1951, pp. 34, illus., H.M.S.O., Lond., 2s.

In this bulletin the operations of threshing seed with a threshing, a clover huller, and a combine harvester are detailed with clear diagrams and explanatory text. A 30-in. seed sheller which will deal with many vegetable seeds such as leek, onion, carrot, sunflower, and runner and haricot beans is also described more briefly. A section is devoted to the threshing of particular vegetable seeds. The importance of conditioning seed after threshing is stressed and various methods of removing extraneous matter and moisture are detailed. Finally, the adjustments necessary to threshing machines and combine harvesters for particular types of seed are tabulated.

57. RAGGIO, M., AND DE RAGGIO, N. M.

Ensayo de viabilidad de semillas con cloruro de 2,3,5-trifeniltetrazol. (**Testing the viability of seeds with the chloride of 2,3,5-triphenyltetrazol.**)

*Bol. Lab. Bot., La Plata*, 1950, No. 3, pp. 1-2, bibl. 7, from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 241.

The chloride of 2,3,5-triphenyltetrazol was shown to be an effective reagent for determining the viability of plant embryos. Its use considerably shortens the time taken by the common methods. Seed is submerged in a 1:1,000 aqueous solution of chloride of 2,3,5-triphenyltetrazol at a temperature of 20-25° C., in darkness. A chemical reaction results which colours the viable seeds red. The viability can be determined in four hours. Plants tried included *Ricinus communis*, *Phaseolus vulgaris*, *Vigna sinensis*, *Hibiscus esculentus*, and *Helianthus annuus*. Of all the plants tried, only *Helianthus annuus* failed to show consistency in staining.

58. BERTRAND, G., AND BERTRAND, D.

**Le rubidium dans les graines. (Rubidium in seeds.)**

*C.R. Acad. Agric. Fr.*, 1951, **37**: 358-61, bibl. 4.

Results of an investigation of the rubidium content of seeds of over 40 crop plants showed wide variation. Thus in seeds of date there were 1.0, of orange 3.24, of apple 3.75, of coffee 45.7 mg. Rb. per kg. of dry material.

**Soil management, drainage and irrigation.**

(See also 970, 1059.)

59. JONES, W. N., AND LEVISOHN, I.

**Acid tolerance in plants.**

*Nature*, 1951, **168**: 791-2, illus.

From results of trials on Wareham Heath with a number of tree species and agricultural plants it would appear that low pH of the soil is not a limiting factor for growth, since growth inhibition can be removed with negligible change in the soil reaction. The addition of a suitable compost or modification of the soil environment without raising the pH may be equally effective remedies.

60. WOODS, J. J.

**Mulches for horticultural crops.**

*Mimeo. Saanichton Domin. exp. Stat.* **125**, 1951, pp. 12.

The results, mainly preliminary, of experiments on mulching that have been carried out at the Saanichton Experimental Station, B.C., are here recorded. They include the following. *Hay mulch for pear trees*: Over a 9-year period mulched plots have given an average annual yield of 1,299 lb. as compared with 916 lb. from the clean cultivated plots. Mulched trees have produced more uniform crops and larger increases in trunk and terminal growth. *Hay or straw mulch for cherry trees*: Terminal growth of mulched trees was double that of unmulched trees but increases in trunk circumference were equal. *Hay and sawdust mulches for boysenberries*: Winter injury was greatest in the hay mulch treatment. Sawdust mulching resulted in the highest average yield over a 3-year period. The use of a cover crop which remained vegetative during the summer depressed yields materially. *Sawdust mulch for loganberries*: Yields and cane growth were better, but winter injury greater, in the mulched than in the clean cultivated plots. *Sawdust mulch for vegetable crops*: In a trial with 13 vegetable crops in 1950 it was found that sowing the seed at a normal depth into the sawdust was unsatisfactory except with radishes and peas, but that sowing on the soil surface and covering with 1 in. of sawdust gave uniformly good results except with carrots and onions. Maturity was advanced in lettuce by the use of a mulch, but retarded in radish, peas, beans, sweet corn and tomatoes, probably owing to the lower soil temperatures under the mulch during August and early September. The mulched plots gave increased yields of radishes, spinach, lettuces, peas, beans, beet, sweet corn, squash and tomatoes, but decreased yields of swede turnips. Late cauliflowers failed completely under mulch. By the end of August all crops on the mulched plots showed symptoms of N deficiency. Other trials include hay and straw mulches for tulips and sawdust mulches for roses, newly seeded lawns, cherry trees, currants and gooseberries, strawberries, and bulb crops.

61. HUDSON, A. W., AND HOPEWELL, H. G.

**The draining of farm lands.**

*Bull. Massey agric. Coll.* **18**, 1950, pp. 184, bibl. 29, illus.

This bulletin, originally designed as a new edition to the authors' earlier bulletin "Mole Drainage in New Zealand", covers a wider field, mole draining as such occupying only a third of its space. After a general consideration of soil and soil water and instruction on preliminary surveying, the authors discuss at considerable length and with the aid of 165 illustrations the most useful modern methods of making and maintaining open drains, tile and other enclosed drains, and mole drains. They devote a chapter to farm



drainage machinery, and one each to financial aspects, land drainage by pumping, and the drainage of peats and peat loams.

62. MYERS, L. F.

**Better ditches and grades.**

*Fmrs' Bull. M.I.A. agric. Ext. Serv.*, 1949, pp. 46, illus. [received 1951].

This bulletin was written specially for horticultural farms in the Murrumbidgee Irrigation Areas of New South Wales. The directions are practical and clear and should be useful far beyond New South Wales.

63. RIEMENS, J. M.

Verzouting en verdroging in het westen van Nederland, meer in het bijzonder in het Westland. (Salinity and drying out of the soil in the west of Holland, and in particular in Westland.)

Reprinted from *Maandbl. LandbVoorlicht-Dienst*, 1951, No. 2, pp. 56-9, as *Publ. Proefst. Groent. Fruit Glas 25*.

The causes of salinity and drying out of the soil are the same: shortage of fresh water. In Kennemerland the surface soil is dry because of the low water table. Water for irrigation has been drawn up by pumps but there is a danger, eventually, of the salt water level being reached. A survey made in 1949 showed that the yield of strawberries on the dry land was 35%, and that of beans only 20%, of that on land with a good water supply. In Westland the glasshouse soils become saline because evaporation exceeds rainfall or irrigation. This can be remedied by heavy applications of tap water, drainage water being too saline. Stringless Double beans supplied with water containing 1 g. sodium chloride per litre showed a crop reduction of 31% compared with those given tap water; water containing 4 g. sodium chloride per l. killed the plants. With Ailsa Craig tomatoes, water containing 1 g. and 4 g. sodium chloride per l. caused a crop reduction of 28% and 54% respectively. The causes of salinity in the various districts are discussed.

64. JOHNSTON, C. N.

**Irrigation wells and well drilling.**

*Circ. Calif. agric. Exp. Stat.* 404, 1951, pp. 32, illus.

Irrigation well drilling is common in California. In this publication, which is essentially for the farmer, the whole basis of well drilling is explained in terms of availability of water. The actual process of digging the wells is discussed at some length and the various mechanical devices are illustrated and their use explained. It is not suggested that the farmer himself shall do the installation but that he shall understand the process and be able to estimate shrewdly the value of any contract proposed to him.

65. STAUCH, —.

L'irrigation souterraine dans la pratique.

(Sub-soil irrigation in practice.)

*Neue Mitt. Landw.* 41, 1950, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 79-80.

A method of supplying water containing nutrient salts to the sub-soil through a fine network of pipes placed at a depth of 0.5 m. is described. Tests over a period of 2 years have given good results, and when used on

dry soils or in glasshouses such irrigation has resulted in considerable increases in yield.

66. ANON.

**Sprinkler irrigation.**

*Pacific N. West Bull.* 3, 1951, pp. 16.

Advantages and disadvantages as compared with surface irrigation are set out with a wealth of illustrations of the relevant apparatus and its mode of action.

**Nutrition.**

(See also 93, 94, 97d, i, l, m, n, p, 260-275, 472, 986, 1049, 1058, 1081.)

67. MINISTRY OF AGRICULTURE, LONDON.

**Manures and fertilizers.**

*Bull. Minist. Agric. Lond.* 36, revised 1951, pp. 96, illus., 3s.

Although following the same lines as the previous edition published in 1940 [see *H.A.*, 11: 16], this 9th edition has been completely revised to keep abreast of recent developments. The first 2 sections deal with the composition, value and use of organic manures and fertilizers, 2 new short subsections having been added on agricultural salt and storage of fertilizers. Part 3 deals with the purchase and valuation of fertilizers, the manuring of farm crops (including potatoes, turnips and swedes, parsnips and legumes), soil analysis, trace elements, and fertilizer placement.

68. BERGE, H.

Das Pflanzenwachstum auf stark-sauren Böden unter dem Einfluss steigender Nährstoffgaben. (Plant growth in strongly acid soils as affected by increased nutrient applications.)

*Z. PflErnähr. Düng.*, 1950, 51: 108-27, bibl. 16.

Owing to the continued application of physiologically acid fertilizers and to the shortage of lime during the war, soil acidification with resulting depressions in yield became a serious problem in Germany. Plot trials showed that acid-susceptible crop plants may be classified in 3 groups. (1) Plants that are affected by free aluminium ions, such as barley and wheat; (2) plants that are affected by a high concentration of H ions, such as rape and poppy; and (3) plants that are only indirectly affected by H ion concentration, such as peas. These will give maximum yields even on strongly acid soils, if N is supplied in adequate amounts. Nodule activity ceases under very acid conditions but, it can be restored by liming.—*Agrikulturchem. Lab., Heiligenhaus*.

69. HARGRAVE, P. D.

**Nutrition of crops on irrigated soils.**

*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 48-52, bibl. 15.

From the limited information available on crop fertility requirements on irrigated lands in western Canada and from deductions made from work in comparable areas, the author draws the following conclusions: (1) The organic content of soils must not be overlooked; (2) N and P fertilizers should be used; (3) the physical condition of the soil is important to maximum yields; and (4) the role of K and minor elements needs investigation.

70. ANDERSON, E. T.  
**Nutritional deficiencies in horticultural plants in the prairie provinces.**

*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 43-5, bibl. 7.

Notes are given on reported N, P, S, Fe, Mn, Zn and B deficiencies with descriptions of the common symptoms and suggested remedies.

71. WALLACE, T.  
**The application of the method of visual diagnosis to trace element problems in plants.**

*Lotsya*, 1950, Vol. 3 (Trace Elements in Plant Physiology), pp. 5-10, bibl. 10.

The subject is briefly discussed under 4 headings: deficiencies; excesses, causing direct toxicities and induced deficiencies; relationships of trace elements to other nutrients; soil acidity effects.

72. HEWITT, E. J.  
**Large scale sand culture methods for the study of trace element nutrition of plants.**

*Lotsya*, 1950, Vol. 3 (Trace Elements in Plant Physiology), pp. 12-18, bibl. 5, illus.

The methods described were specially designed to permit the study of nutritional relations in plants, particularly trace element deficiencies of Fe, Mn, B and Mo, when it was necessary to work on a large scale owing either to the scope of the experiment or to the size of the plants used. The required materials, i.e. containers, sand, water and nutrient reagents, are considered in some detail. Two diagrams are given to illustrate a demineralized water system flow-sheet and an automatic sand washing equipment.

73. WOODS, J. J.  
**Minor element experiments 1943-1950.**  
*Mimeo. Saanichton Domin exp. Stat.*  
123, 1951, pp. 5.

The overall indication of experiments at Saanichton and of analyses made at Ottawa is that except boron—for a few crops—minor elements are in plentiful supply in Vancouver soils. The indications given in experiments, many of them still in progress, on a large range of horticultural crops are set out here.

74. ČAIŁAHJAN, M. H.  
**The effect of boron on the development of plants deprived of roots.** [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 1115-18, bibl. 3, illus.

From results recorded it is concluded that lack of boron is the basic cause of the inability of the rosette-forming *Rudbeckia*, when deprived of roots, to form normal stems, to produce flower buds and to blossom even under favourable conditions of long-day illumination.

75. SCHROPP, W.  
**Stand der Forschung über das Spurenelement Bor.** (A review of the literature on the trace element boron.)  
*Z. PflErnähr. Düng.*, 1950, 51: 127-39, bibl. 65.

(1) A list of plants, arranged according to family, for which boron has been proved indispensable. (2) The necessity of boron for pollen germination. (3) Boron susceptibility and tolerance of certain crop plants.

76. THORNE, D. W., WANN, F. B., AND ROBINSON, W.

**Hypotheses concerning lime-induced chlorosis.**

*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 254-8, bibl. 21.

The various hypotheses that have been put forward to explain the relation of observed facts to the occurrence of lime-induced chlorosis are critically reviewed in the light of available information, including data accumulated by the authors during the past 5 years. It is concluded that "The oxidation of iron to the ferric state and possible inactivation in protein combinations followed by a disturbance in the protective protein-chlorophyll combination appears as a plausible concept to explain part of the relationships involved in chlorosis. This concept is in need of further investigation, particularly in relation to conditions associated with high-lime soils."

77. V. BRONSART, H.  
**Erhöhung des Vitamin-C-Gehalts durch Mangandüngung.** (Increase of the vitamin C content by fertilizing with manganese.)

*Z. PflErnähr. Düng.*, 1950, 51: 153-7, bibl. 4.

Whereas in one experiment on black currants at Hohenheim the ascorbic acid in the berries from both treated and untreated plots reached a maximum of approximately 246 mg. per 100 g., in another locality the same dose, viz. 15 g.  $MnSO_4$  per  $m^2$ , increased the vitamin C content of black currants and tomatoes by 28.6% and 18.6% respectively over that of the controls. In other experiments with tomatoes the proprietary fertilizer Manganal (28.55% water-soluble manganese), applied at the same rate, produced increases in vitamin C content of 26-29%. Seed treatment with a water-insoluble manganese compound (patented process) had also the effect of increasing the vitamin C content. The seeds should be thoroughly mixed with a fine dust of  $MnO_2$ , for instance, and then riddled to free them from the excess  $MnO_2$  not attached to the testa. After that the seeds are sown in the ordinary way. In tests carried out in 1935 the vitamin C content of spinach leaves from treated seed was 27% higher, and in 1947 the vitamin C content of tomato fruits was 9.4% higher, than that of the controls. The treatment is very economical, as not more than about 1.8 g.  $MnO_2$  remain attached to spinach seed after riddling. As little as 5.4 g.  $MnO_2$  would therefore be sufficient to treat 250 g. of seed and significantly to affect vitamin C formation in spinach leaves over an area of 100  $m^2$ . The method is thought to be of practical interest and experiments on a larger scale are planned. The function of the testa in germination is briefly discussed.

78. BERNAL, D. M.  
**El azufre en la fisiología de las plantas.** (Sulphur in plant physiology.)  
*Agric. trop. Bogotá*, 1950, 6: 4: 45-50, illus.

A review of our present knowledge of the part played by sulphur in plant metabolism and of the symptoms of sulphur deficiency.

79. BRUNO, M.  
**La carence zincique.** (Zinc deficiency.)  
*Phytoma*, 1950, No. 21, pp. 10-13, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 180-1.

Symptoms of zinc deficiency are described for various crops, including apple, pear, peach, citrus, cherry, pea, bean, potato, vine and tobacco, and methods of control are reviewed.

### Culture media.

80. NITSCH, J. P.  
Growth and development *in vitro* of excised ovaries.  
*Amer. J. Bot.*, 1951, 38: 566-77, bibl. 31, illus.

This paper is the first of a series reporting experiments in fruit physiology in which the technique of fruit culture *in vitro* has been used. It deals with general problems such as techniques, general pattern of growth of excised fruits, importance of pollination, and action of synthetic auxins. Tomato, gherkin, bean, tobacco and strawberry were used as experimental material. Preliminary results showed that excised tomato and gherkin ovaries can grow *in vitro* and form fruits which ripen and may even produce viable seeds, at least in the case of gherkins. Such a development can proceed on a very simple nutrient medium, composed of sucrose and mineral salts only, providing that the flowers have been pollinated and left on the plant for a suitable length of time. When excised before pollination, ovaries do not develop appreciably on the same medium. Addition of synthetic growth substances to the nutrient solution caused unpollinated tomato ovaries to develop, thus inducing parthenocarp in *in vitro*. Such an effect was not observed with unpollinated gherkin ovaries. The bulk of the reported results indicate that the pattern of ovary growth is not altered by culturing *in vitro*, so that such a technique may be used as a tool to investigate certain aspects of fruit physiology. As an example of such an application, the physiological meaning of flower abscission in fruit development is briefly discussed in the light of the *in vitro* experiments.—Calif. Inst. Technol., Pasadena.

81. BOLL, W. G., and STREET, H. E.  
Studies on the growth of excised roots.  
1. The stimulatory effect of molybdenum and copper on the growth of excised tomato roots.  
*New Phytol.*, 1951, 50: 52-75, bibl. 35.

An examination was made of the factors responsible for the poor growth of excised tomato roots in certain batches of White's medium. Additions of copper and molybdenum resulted in marked improvement of the growth in these media. Maximum increase in growth resulted from the addition of 0.0001 p.p.m. Mo to otherwise unsatisfactory media.

82. PEČENICINA, A. M.  
Sterile cultures of the higher plants under conditions of heterotrophic nutrition.  
[Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1950, 73: 1297-1300, bibl. 9, illus.

A method is described of growing seedlings in liquid culture, under aseptic conditions, in test tubes. Data show the assimilation of glucose, by the sprouts of radish and buckwheat, under such conditions.

### Practical devices.

(See also 97h, 191, 235, 250a, 483, 628, 631b, 711, 713.)

83. KEPNER, R. A., and LEACH, L. D.  
A continuous spray-type seed treater.  
*Agric. Engng, St. Joseph, Mich.*, 1949, 30: 519-23, 527, from abstr. in *Field Crop Abstr.*, 1950, 3, abstr. 767.

Tests with an experimental unit for seed treating have been completed. The performance of the unit was evaluated with respect to mechanical difficulties, uniformity of seed coverage (its chief advantage) and the degree of protection afforded by fungicides.

84. LENOIR, F. L.  
De turven kweekpotten. (Turf plant pots.)  
*Cult. Hand.*, 1951, 17: 566-7, illus.

A method is described of making and using plant pots cut out of turf. A block of turf is pierced with holes and then cut into squares of the size required; the cuts do not pass right through the block, so that the pots are held together by a basal layer. The advantages are said to be lightness of pot, ease of handling, less soil necessary, absence of check to growth on transplanting, and the fact that the turf acts as slow-acting humus.

85. ANON.  
Cement pots have a future.  
*Fruitgrower*, 1951, No. 2911, pp. 615-16, illus.

Earlier yields, freedom from disease and a saving in fuel are some of the advantages claimed for the use of cement pots, which are particularly suitable for indoor tomatoes.

86. FOOT, A. S., and LOVETT, J. F.  
Electric fencing.  
*Bull. Minist. Agric. Lond.* 147, 1951, pp. 25, illus., bibl. 6, 1s. 0d.

The authors deal with the uses of the electric fence in agriculture and forestry, comparing it with that of ordinary fencing. They consider it has a great future not as a permanent fencing but as a temporary barrier, or where large areas of land need division in a ley farming scheme. They detail the construction and the erection and maintenance of such fences. Mains electricity is not as yet used for the purpose in Britain. The authors provide just the sort of help that will be invaluable to anyone contemplating and hesitating over the erection of such fences.

87. MARTENS, K.  
Elektro-Baumschutz für Schweine und Kälberweiden. (Electric tree protection in pastures.)  
*MittBl. ObstbauberatRings Süddoldenburg*, 1951, No. 3.

Isolated metal rings joined by wires connected to a battery were secured to fruit tree trunks. They appeared effective against pigs, calves and horses. O.J.

88. MINISTRY OF AGRICULTURE, LONDON.  
Farm and estate roads.  
*Fixed Equip. Fm Leaflet. Minist. Agric. Lond.* 12, 1951, pp. 23, illus., 9d.

Considerable aid is offered by this leaflet to the farmer who wants to keep his existing roads in repair, to



improve them or to supervise the construction of new ones. Consideration is given to type of road, whether waterproofed or permeable, type of traffic, type of soil (soft e.g. loam or soft clay, medium e.g. sand, stiff clay or chalk, or hard e.g. gravel, solid chalk or rock), the materials wanted for a stone (or hardcore) road, its surfacing and the surfacing materials, maintenance and repairs. The making of a concrete road and the remaking of old roads are discussed separately.

89. WALRAVE, J.

Een eenvoudige methode voor de localisatie van insecten op bepaalde bladeren van een plant. (A simple method for localizing insects on particular leaves of a plant.) [English summary 7 lines.] *Tijdschr. Plziekt.*, 1951, 57: 126-7, bibl. 3, illus.

The apparatus described consists of (1) a glass or plastic cylinder, height 10 mm., diameter 12-15 mm., (2) a coverglass, (3) a small plastic ring, and (4) a piece of watch-spring. These component parts and a plant with the apparatus attached are illustrated.

90. CRADDOCK, J. M.

An apparatus for measuring dewfall. *Weather*, 1951, 6: 300-8, illus.

An illustrated description is given of the design and construction of a recording lysimeter. The measurements of dewfall, taken in one garden in England, suggest that under favourable conditions the dewfall may be rather more than has hitherto been supposed.

91. NEWHALL, A. G., AND GUNKEL, W. W.

A duster for row application of fungicide and/or insecticide at the time of sowing seeds. *Plant Dis. Repr.*, 1951, 35: 219-20, illus.

A chain-driven rotary duster on a small tractor-driven seeder is illustrated, and data from some field results in the control of onion smut and thrips are tabulated.

92. GUILLOU, R.

Adjustment of soil fumigant injectors with engine-driven pumps. *Agric. Ext. Circ. Hawaii agric. Ext. Serv.* 305, 1951, pp. 2.

A method of adjusting and checking the rate of delivery of soil fumigant injectors mounted on tractors is described, with the aid of a table showing the distance to be travelled to give a stated gallonage per acre for different tine widths and an injection of  $\frac{1}{2}$  pint per tine.

93. LYND, J. Q., AND TURK, L. M.

Preparation of permanent plastic color standards for rapid soil and plant tissue testing. *Proc. Soil Sci. Soc. Amer.*, 1950, 15: 152-3, being *J. Art. Dep. Soil Sci. Mich. St. Coll.* 1181.

Satisfactory permanent plastic standards have been prepared for phosphorus, potassium, magnesium and calcium tests. They are especially adapted for field testing.

94. LYND, J. Q.

Use of plastics in preserving specimens of plant tissue showing nutritional deficiency symptoms. *Quart. Bull. Mich. agric. Exp. Stat.*, 1951, 34: 17-21, bibl. 2, illus.

The plastic material used is a commercial liquid casting material known as "Castolite". A layer of this liquid, into which a small amount of oxidizing catalyst has been added to harden the plastic, is poured into a suitable mould and allowed to gel or partly harden. The stem of the dried leaf specimen is grasped with tweezers, and the leaf is carefully immersed, facing downwards. Additional plastic is poured over to cover the specimen completely and when partially set a background layer, usually white, obtained by mixing into the liquid plastic a white opaque dye, is poured over the embedded specimen. When set, the finished piece is removed from the mould when the bottom surface, now glossy, hard and smooth, is actually the top or exposed surface of the mounting. The procedure is quick, the cost low and the final product very effective and most suitable for demonstrating foliage symptoms of nutrient deficiencies.

95. BERNHEIM, F., BUNN, C., AND WILBUR, K. M.

The thiobarbituric acid color reaction in plant tissues.

*Amer. J. Bot.*, 1951, 38: 458-9, bibl. 6, illus.

The reaction of thiobarbituric acid with lignin has been utilized in a simple method for demonstrating the vascular system in cleared whole mounts of stems and roots.

96. KNOWLES, R. P.

Miniature cameras for photomicrography.\*

*Sci. Agric.*, 1951, 31: 323-4, bibl. 6, illus.

Description of the use of a 35 mm. camera [actually Argus C-3] whereby it is thought, provided film is bought in bulk, a fairly complete record of work can be made at low cost.

Noted.

97.

a BUTLER, G. W.

Determination of glutamine and asparagine in plant tissue extracts.

*Analyt. Chem.*, 1951, 23: 1300-4, bibl. 20.

b DUCRET, M. G.

L'électricité, source de chaleur de fond. (Electricity as a source of soil heating.)

*Jardins Fr.*, 1950, 4: 229-35, illus.

c DUFFY, R. M.

Comparative cellular configurations in the meristematic and mature cortical cells of the primary root of tomato.

*Amer. J. Bot.*, 1951, 38: 393-403, bibl. 30, illus.

d ERKAMA, J.

Effect of copper on the iron uptake of plants.

*Acta Chem. Scand.*, 1949, 3: 980-7, from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 1182.

e HASKELL, R. J.

Present national picture in extension work in horticulture.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 447-50.

\* See also *H.A.*, 21: 3229b.

- f HEMBERG, T.  
Establishment of acid growth-inhibiting substances in plant extracts containing auxins by means of the Avena test.  
*Physiol. Plant.*, 1951, 4: 437-45, bibl. 16.  
The plant extracts were prepared from tomatoes.—*Inst. Plant Physiol.*, Univ. Stockholm.
- g HEMBERG, T.  
Rooting experiments with hypocotyles of *Phaseolus vulgaris* L.  
*Physiol. Plant.*, 1951, 4: 358-69, bibl. 16.
- h KALBFLEISCH, W., AND OTHERS.  
Farm trailers, wagons and racks.  
*Publ. Canada Dep. Agric.* 830, 1951, pp. 24, illus.
- i LANDE, F.  
Trace elements in the soil.  
*North. Gdnr.*, 1951, 5: 235-7.  
A popular account.
- j LEME, J. JR., AND MALAVOLTA, E.  
Determinação fotométrica do ácido ascórbico. (Photometric determination of ascorbic acid.) [English summary  $\frac{3}{4}$  p.]  
*An. Esc. sup. Agric. "Luiz de Queiroz"*, Piracicaba, 1950, 7: 115-29, bibl. 4.
- k LEVITT, J.  
The osmotic equivalent and osmotic potential difference of plant cells.  
*Physiol. Plant.*, 1951, 4: 446-8, bibl. 1.
- l LÖNNIS, M. P.  
Injury through excess of manganese.  
*Lotsya*, 1950, Vol. 3 (Trace Elements in Plant Physiology), pp. 63-76, bibl. 3.  
For another account of the same work, see *H.A.*, 21: 3207.
- m MALAVOLTA, E.  
Dosagem rápida do fósforo no colorímetro fotoelétrico. (The rapid determination of phosphorus [in plant material] with a photoelectric colorimeter.) [English summary  $\frac{3}{4}$  p.]  
*Rev. Agric. Piracicaba*, 1951, 26: 21-8, bibl. 4.
- n MESA-BERNAL, D.  
Funciones del boro en la vida vegetal. (The functions of boron in plant life.)  
*Agric. trop. Bogotá*, 1951, 7: 2: 57-61.
- o MINISTRY OF AGRICULTURE, LONDON.  
Irrigation.  
*Bull. Minist. Agric. Lond.* 138, 1947, reprinted 1951, pp. 46, bibl. 56, illus.  
A reprint, with slight amendments, of the first edition [see *H.A.*, 17: 1899].
- p OUELLETTE, G. J.  
Iron-manganese interrelationships in plant nutrition.  
*Sci. Agric.*, 1951, 31: 277-85, bibl. 16.  
Soyabean was used as the indicator plant.
- q PELEGRIN, M. P., AND NAVELLIER, E.  
Production fruitière d'Ostre-Mer et perfectionnement mécanique. (Mechanization of fruit production in the French colonies.)  
*Cahiers Col. déc.*, 1950, pp. 429-36, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 151.  
Mechanization of cultivation, packing and preservation.
- r RECKENDORFER, P.  
Die Bestimmung von Fluor in rauchgeschädigten Pflanzen. (Determination of fluorine content of plants damaged by industrial smoke.)  
*PflSch. Ber. Wien.*, 1951, 6: 113-24, bibl. 17, illus.
- s RIDER, N. E., AND ROBINSON, G. D.  
A study of the transfer of heat and water vapour above a surface of short grass.  
*Quart. J. roy. met. Soc.*, 1951, 77: 375-401, bibl. 23.
- t SMITH, L. P.  
Temperatures under Dutch lights.  
*Met. Mag.*, 1951, 80: 50-2.  
Analysis of readings taken at Botley Experiment Station, Hants., Engl., during the early months of 1949 and 1950.
- u THOMPSON, J. F., AND STEWARD, F. C.  
Investigations on nitrogen compounds and nitrogen metabolism in plants. II. Variables in two-directional paper chromatography of nitrogen compounds: A quantitative procedure.  
*Plant Physiol.*, 1951, 26: 421-40, bibl. 25.
- v TUKEY, H. B.  
Integrating extension work with research and teaching for an effective horticultural program.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 451-5, bibl. 2.
- w UMRATH, K.  
Dornenbildung, Blattform und Blütenbildung in Abhängigkeit von Wuchsstoff und korrelativer Hemmung. (Spine formation, shape of leaf and flower formation in relation to growth substance and correlative inhibition.)  
*Ber. wissenschaftl. Biol.*, 1949, 66: 418 [received 1951].
- x UNITED STATES RUBBER EXPORT COMPANY LTD.  
MH-30.  
[Publ.] *U.S. Rubb. Export Co. Ltd.*, MHIS 3, 1951, pp. 2.
- y WHITE, D. G.  
Maleic hydrazide, an all-purpose plant growth-regulator.  
*Discovery*, 1950, 11: 379-81, from abstr. in *Rev. argent. Agron. B. Aires*, 1951, 18: 183-4.
- z ZUKEL, J. W.  
Summary of information on maleic hydrazide.  
[Publ.] *U.S. Rubb. Export Co. Ltd.*, MHIS 5, 1951, pp. 31, illus.  
Abstracts of 99 papers.

# TREE FRUITS, DECIDUOUS.

## General.

(See also 58, 1050, 1085, 1091, 1092, 1108, 1113, 1115, 1119, 1120.)

### 98. BREVIGLIERI, N.

Note su un viaggio di studio in Inghilterra.  
(A study tour in England.)

*Riv. Ortoflorofruttic. ital.*, 1951, 35: 189-222, illus.

The author, an eminent horticultural investigator of the University of Florence, made a lightning tour of English fruitgrowing in the early autumn of this year. He visited leading growers, Covent Garden, men prominent in the Royal Horticultural Society, orchards and packing houses in Worcestershire, Essex, Kent and elsewhere, the John Innes Horticultural Institution, Wisley, Long Ashton and East Malling, among other centres. He did not waste his time and his account of what he saw must certainly be much the best general picture of English fruitgrowing that has ever been available to the Italian public, for, while cramming much information into a very short space, he maintains, nevertheless, a pleasing clarity throughout. Furthermore, and this is not unexpected in an Italian journal, his illustrations are most effective.

### 99. MONTGOMERY, H. B. S.

Research in fruit-growing. The importance of scientific investigation.

*The Times Review of the Progress of Science*, 1951, No. 2, pp. 5-6, illus., 6d.

The author deals chiefly with phases of investigation which are at present engaging the attention of research workers at the East Malling Horticultural Research Station. They include work on propagation of rootstocks from cuttings, soil management including cover cropping and mulching, the determination of trace element status in trees, spring frost damage prevention, virus disease dangers to top as well as to small fruits, and the reasonable use of pesticides.

### 100. DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA.

Fruitgrowing in Western Australia.

6, 368-74, 386-94, illus.

[Publ.] *W. Aust. Govt Tourist Publicity Bur.*, 772 Hay Street, Perth, W.A., or 115-116 Strand, London, 1950, pp. 10, illus.

This gives one a very good idea of fruitgrowing in Western Australia. It is considered that, while the demands of a growing population will require some increase in the areas under stone fruits, any expansion in the citrus, apple or dried vine fruit production must depend on recovery in Europe and the degree of improvement of the standard of living in parts of Asia. A small tropical fruit industry, mainly bananas, is established under irrigation on the banks of the Gascoyne at Carnarvon some 600 miles north of Perth. The total area under orchards and vineyards is about 30,000 acres, apples accounting for a third and vines for another third. The apples are largely exported to Singapore or Europe. Some 4,000 acres are under citrus, mainly oranges, 2,000 under stone fruits, peaches, plums, nectarines and apricots. About 40% of the citrus and much of the stone fruit is irrigated

in summer. Some vineyards and apple orchards are also irrigated. In this bulletin details are given on orchard management, on the fruit trade and on probable costs and returns to any one entering the industry. The various organizations giving information on farming in Western Australia are cited.

### 101. READ, F. M.

Contributions of agricultural research in crops—2. Temperate horticulture.

*J. Aust. Inst. agric. Sci.*, 1951, 17: 77-9.

Pot culture technique has been of great assistance in detecting deficiency symptoms. These cultures, together with field experiments, showed that phosphates were of limited value for fruit trees but that nitrogen was of great importance. The work was later extended to the trace elements, tissue tests and injection techniques also being used. Great advances have been made in the last fifty years in the technique of storing various fruits. Australian plant breeders have not contributed materially to new varieties, but great advances in propagation and rootstock selection have been made. The development of plant hormones has assisted in the control of fruit-drop and in the parthenocarpic setting of fruit. Growth substances have also assisted in the problem of delayed foliation, due to insufficiently cold winters, and in the control of fruit size and number. There has also been much development in the use of insecticides and fungicides.

C.W.S.H.

### 102. KELL, J.

La situation économique de la fructiculture belge. (The economic situation in Belgian fruit growing.) [English and German summaries 7 lines each.]

*Rev. Agric. Brux.*, 1951, 4: 823-42.

Figures are given showing the economic position of fruit growing in Belgium, and the principles that should be followed in planning future policy are indicated. At present production exceeds consumption, hence the fruit acreage must not be extended until consumption is increased. Production may vary from 100,000 to 700,000 tons per year and should be stabilized by improving cultural practices, better protection against spring frosts and growing only regularly bearing varieties. About 82% of the fruit is marketed during the months July-October; it could be more evenly distributed throughout the year if more late varieties were grown and if storage and processing facilities were improved. Standardization of quality and presentation is an urgent necessity. Production must be protected against abnormal competition. Old orchards need modernizing.

### 103. STRAHM, W., HIRT, W., and FRITZSCHE, R.

Die Landwirtschaftliche Genossenschaft Kirchberg (Bern) im Dienste zur Förderung der landwirtschaftlichen Qualitätsobstproduktion. (The Agricultural Co-operative Society Kirchberg (Bern), established for the promotion of high quality fruit production.)

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 342-6, 368-74, 386-94, illus.

To improve the quality yet keep production costs of



fruit low on small mixed farms in Switzerland, work is very often carried out on a communal basis. The organization of such an agricultural co-operative, comprising 241 members and owning 11,905 fruit trees, is outlined in this article, and the work, communally planned including pruning, fertilizing, plant and frost protection, is described. Not only orchard work but also storage and sales are carried out communally.

104. WESTERN AUSTRALIA FRUIT ADVISORY COUNCIL.

*Apple and pear pamphlet 5*, 1951, pp. 23.

Useful practical directions are given on all the operations necessary in an apple orchard from thinning through spraying to harvesting and marketing, so as to satisfy export and other requirements. Picking and packing of pears are also detailed and full information is given on the grading of apples and pears.

105. LAMB, J. G. D.

*The apple in Ireland: its history and varieties.*

*Econ. Proc. roy. Dublin Soc.*, 1951, Vol. 4, No. 1, pp. 63, bibl. 43, illus., 20s.

The history of apple growing in Ireland is traced from the earliest references in monastery records of the time of St. Patrick, through miscellaneous and scattered records of the extent of apple growing in various districts and of the varieties grown up to the present day. The varieties now being planted are practically all of foreign origin and relatively few are grown commercially, while local varieties well adapted to Irish conditions are rapidly dying out. In order that an estimate of their value to the farmer, connoisseur or plant breeder may be made before it is too late, the author has made a study of these Irish varieties and he here presents detailed pomological descriptions of those which could be identified. Sixty-nine varieties are described, 29 of them being illustrated in black and white. In addition to the pomological descriptions, notes are given on the history of each variety where known, its distribution, quality and notable characters such as disease resistance.

106. BUREAU OF AGRICULTURAL ECONOMICS.

*The Tasmanian apple and pear industry.*

*Bull. Bur. agric. Econ. Dep. Commerce Agric.* Aust. 6, 1950, pp. 60.

A factual analysis of information obtained by visits to all commercial orchards in November and December 1948. The orchards cover 21,000 acres and are mainly in the Huon, Derwent and Tamar Valleys and Channel District with less important areas on the East Coast and in the North West. Apple trees outnumber pears about nine to one. Northern Tasmania has only about 20% of the total apple trees and they are not so prosperous as those in the south. This superior production of the southern orchards is becoming more marked. About 60% of the orchards have no other cash crop. Most orchards are between three and six acres, others being of six to nine, nine to twelve and twelve to fifteen acres with about 10% of less than three acres, and a few larger ones. Sturmer and Jonathan apples and winter Cole pears are grown on over 90% of the orchards. Details are given of the features of general management of the orchards and estimates are made of the probable position in 1956.

107. LOEWEL, E. L., and others.

*Neuanlagen in der Marsch. Richtlinien für die Anpflanzung von Äpfeln. (New plantations on marshland. Directions for apple planting.)*

*Mitt. ObstbVersuchsrings Jork*, 1951, 6: 119-26, illus.

Diagrammatical illustrations show five types of planting suitable for the marshy soils of the Altenland. The suggested distances in the rows are 6, 8, 10, 11 and 12 m. and the appropriate varieties together with rootstocks are given.

108. WYE COLLEGE DEPARTMENT OF ECONOMICS.

*Apple and pear yields in Kent 1948-50.*

[*Mimeo. Publ.*] *Wye Coll.*, 1951, pp. 6.

Yields per acre from 50 commercial farms in bushels [1 bushel=approx. 40 lb. apples, 48 lb. pears] of commercially grown apple and pear varieties.

109. BELOHONOV, I.

*Fruit trees in the protective woodland belts.* [Russian.]

*Kolhoz. Proizv.*, 1951, 11: 8: 36-7.

Planting fruit trees, especially apricots, in the protective woodland belts is recommended as an aid to the shelter of other crops and as a source of revenue. The apricots should be planted along the edges of the shelter belts, and not within them, where they will be suppressed by the forest trees. [See also *H.A.*, 21: 328.]

110. BAUDEWILN, J.

*La culture des cerises au Limbourg. (Cherry growing in Limburg.)* [English and German summaries ½ p. each.]

*Rev. Agric. Brux.*, 1951, 4: 284-300, bibl. 1.

Half the cherry crop of Belgium is produced in the province of Limburg. Data are given on acreages, production, varieties and age of trees. In St. Trond, one of the most important cherry growing districts, only 0-25% of the cherry orchards are on the best fruit soils. The most extensively grown varieties are Française hâtive (Early Rivers), Abbesse de Mouland and Waalse, which are not particular in their soil requirements. Since 1947 many of the orchards have been neglected. Some of the economic problems of harvesting, marketing and export are discussed and suggestions are made for safeguarding the future of the industry.

111. WILSON, J.

*Peaches and nectarines.*

*J. roy. hort. Soc.*, 1951, 76: 317-22.

Information is given for all the year round care of established trees in cold houses, and fan-trained trees in the open. Suitable varieties are listed for both purposes, a note is included on peaches in bush form, and control measures are suggested for the most common pests and diseases.

112. FERGUSON, B. L., WOODWARD, R. S., AND HAWTHORNE, L.

*Louisiana's program for peach production.*

*Ext. Bull. La St. agric. Coll.* 1095, 1951, pp. 18, illus.

In this comprehensive pamphlet a list is given, with ripening dates, of peaches suited to the Louisiana

climate. A free draining, terraced soil on a northern slope is preferred. As an alternative to clean cultivation, *Ceanothus speciosus* can be grown before planting, and allowed to reseed itself until the trees come into bearing. After this the land should be cultivated and sown in the autumn to be turned under in May.

C. W. S. H.

#### 113. FORTNA, J.

##### Characteristics of demand for California plums.

*Alimentaria*, 1951, 20: 407-427, illus. 24.

This report is concerned with determining on a statistical basis the chief factors responsible for variations in wholesale prices of California plums. It is not oriented towards a direct consideration of consumer demand, as reflected by their behaviour at the retail counter, nor of the price-quantity relation encountered by growers in disposing of their crop on the farm. Rather the investigation attempts a statistical derivation of "demand" reasons facing handlers who sell plums at auction markets. Plums are included under the term *plums*.

#### 114. SIDWELL, R. W., and FREEMAN, D. J.

##### A proposed terminology for plum stone characters.

*Garden's Chron.*, 1951, 130: 120, bibli. 3, illus.

A terminological system has been developed which allows an adequate description of plum stones and a tentative key has been worked out and it is equipped with the aid of diagrams, for the identification of plum varieties by this means. It is stated that by using various fruit, foliage and stone characters together with stone characters the accurate determination of a plum variety becomes comparatively simple. The terms suggested to describe the stone characters are: socket, neck, face, shoulder, shoulder groove, main facial ridge, secondary facial ridge, cross ridge, dorsal groove, and ripple marks.

#### 115. GARDNER, J. J.

##### Olive culture in California.

*Civ. Calif. Agric. Exp. Serv.* 135, 1947, pp. 36, bibli. 11, illus. [received 1951]

California has some 99% of the olive acreage and production of the U.S.A. Its production in 1944 was 42,000 tons. Owing to great competition from Europe, mainly Spain and Italy, most are grown for pickling. The chief varieties are Mission, Manzanillo, Sevillano, Ascolano and Bandum. Propagation, which is discussed, is by hardwood or softwood cuttings or grafting onto seedling roots. All cultural operations including control of pests and diseases are considered, and notes are given on handling the crop and on economic marketing.

#### 116. OZGENOV, G. V.

##### Methods of hastening the cultivation of the olive in the south-west of the Turkmen S.S.R. [Russian]

*Sovskoye Akad. Nauk S.S.S.R.*, 1951, 78: 104-52.

The climate in the south-west of the Turkmen Republic is very suitable for the olive, but its cultivation is not spreading rapidly owing to the lack of nursery material and the difficulty of its propagation both

vegetatively and from seed. Methods of overcoming the delayed and slow germination of the seed are discussed with special mention of the removal of part of the seed coat. Another obstacle is the high salinity of the soil in that region, which adversely affects seed germination. It is stated, however, that seedlings raised on saline soil and transplanted to a similar soil grow better than seedlings raised on a non-saline soil before transplantation to a saline soil.

#### Breeding and varieties.

See also 106, 106, 106, 115, 203, 1, 1060, 1073, 1

#### 117. LEE, C. R.

##### A partial progress report on fruit improvement at the Dominion Experimental Station, Maricao, Manilla.

*Rep. Proc. 7th ann. Mtg. west. Canad. Soc. Hort.*, 1951, pp. 33-3.

Adverse weather conditions since 1942 and some of the resulting damage in fruit plantings are noted. The result has been to narrow down somewhat the list of varieties considered fully adapted to southern Manitoba, the area covered by this report. *Crab apples*: Progress is being made towards the development of a large-fruited Doigo type easy to harvest yet possessing the flavour and jellifying qualities of Doigo. *Apple crabs*: The varieties Redstart, Trail and Howards are recommended. *Apples*: Progress in the improvement of varieties has been somewhat difficult, for, through varieties like Hyslop 11, Bode, Mission, Pear Apple and Mann 455 cropped regularly, they leave much to be desired in colour, appearance, fruit quality and season. Improved colour is sought in the new varieties but of greater value is the attainment of superior quality whilst retaining present hardiness. A number of promising new selections have been tested during the past 10 years. *Plums*: Among the older varieties, Assorted, Bount, Dandy, Manilla, McIntosh, Northern and Owen are the best of the Canada Plum group. *Prunus sp.*: The greatest encouragement in hardy plums for the prairie has come from a group classed as *Prunus americana* or Japanese plum. *Sand cherry-plum* hybrids: The quality of fruit produced on the better varieties compared favourably with the best of the large hybrid plums, they are moreover, low and bushy and thus receive much winter protection from snow. *Sour cherry plums*: While some of the European plums grow satisfactorily, several for untreated hardiness conditions. *Cherries*: The greatest promise here came from the Dwarf Bush Cherry. *Prunus fruticosa*: Apricot and pear improvement has been slow.

#### 118. PATTERSON, C. F.

##### Summary of accomplishments in fruit work to date at the University of Saskatchewan.

*Rep. Proc. 7th ann. Mtg. west. Canad. Soc. Hort.* 1951, pp. 22-4.

Fruit hardiness is the main characteristic of the fruit varieties grown in Saskatchewan. Results obtained to date in improvement work, to combine desirable fruit quality with hardiness in apples, plums, pears, cherries, apricots, peaches, raspberries, strawberries, gooseberries, and grapes, are set out in this paper.

119. WELLINGTON, R., HOWE, G. H., and SLATE, G. L.  
Fruit varieties originated at the New York State Agricultural Experiment Station, Geneva, N.Y.  
*Fruit Year Book 1951-2*, 1951, pp. 10-18, illus.

Since its establishment in 1880 the New York State Agricultural Experiment Station has named and introduced 151 varieties of fruit, many of which, such as the Cortland apple, Fredonia grape and Catskill strawberry, are now extensively grown. Brief notes are given on the more important varieties.

120. FRUITS COMMITTEE OF THE W.C.S.H.  
Systems used in the numbering of seedlings and selections particularly of fruit materials at stations in Canada.  
*Rep. Proc. 7th annu. Mtg. west. Canad. Soc. Hort.* 1951, pp. 11-14.

To a request for information eighteen Experimental Stations submitted replies outlining their system. No mention is made of stations where no special system of numbering has been adopted.

121. FRENCH, A. P.  
Overcoming the problem of misnamed nursery stock.  
*Amer. Fruit. Gr.* 1951, 71: 10: 12-13, 20, illus.

The causes of mixed nursery stock and the work of the "trueness-to-name" inspection service operating in the eastern states of U.S. are briefly outlined. The characteristics by which apple and pear and some stone fruit varieties can be distinguished are enumerated and the varieties most frequently intermixed are named.

122. BRACEY, G. F., and BRACEY, P.  
Some characteristics of apple varieties grown in Glamorgan, South Wales  
*Fruit Year Book 1951-2*, 1951, pp. 68-73, bibl. 8.

Some observations made over a period of five years are recorded on the performance, quality and commercial possibilities of a number of dessert apples grown in Glamorgan.

123. SCHUPHAN, W.  
Vitamin-C-Gehalt deutscher Apfelsorten.  
(Vitamin-C content of German apple varieties.)  
*Gartenwelt*, 1950, 50: 252.

The average ascorbic acid content of eighty apple varieties was 13.4 mg. %. A list of varieties is given which shows a considerable variation in analyses from year to year. Calvill showed the highest figure, 31.8 mg. %, and Nathusius Taubenapfel the lowest, 3.4 mg. %.

124. KON, K.  
Bud mutation in apples. [Japanese with short English summary.]  
[Publ.] *Aomori Apple Exp. Stat.* received 1951, pp. 12.

An account in Japanese of the meaning of bud mutation and a description of certain bud sports found useful in Japan of Ralls Janet, Delicious, King David, Jonathan, Red Astrachan, and Summer Pearmain.

125. BISHOP, C. J.  
A study of male parental influence in crosses with the Northern Spy apple.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57:165-8, bibl. 4.

A comparison was made between apples produced in 1948 and 1949 from 318 Spy × Cox's Orange seedlings, 327 Spy × Ben Davis seedlings and 183 Spy × Golden Russet seedlings, Spy being the female parent in each case. With the Cox's Orange cross the apples were small, sweet, early and showed considerable russetting, high quality, fair appearance and scab resistance. Ben Davis crosses gave small, waxy, acid, low quality apples, very susceptible to scab but of fair appearance. Golden Russet crosses gave small, sweet, low quality, russet apples of poor appearance and susceptible to scab.

C.W.S.H.

126. ROBERTS, A. N., and HAMMERS, L. A.  
The native Pacific plum in Oregon.  
*Stat. Bull. Ore. agric. Exp. Stat.* 502, 1951, pp. 21, illus.

The characteristics of *Prunus subcordata* and its numerous selections are considered in some detail in this progress report on a wild native fruit tree which produces an excellent preserve.

127. PUTOV, V. S.  
The plum in Siberia. [Russian.]  
*Sad i Ogorod*, 1951, No. 8, pp. 31-6.

The plums grown in Siberia comprise three groups, ussuriian, karzinian (raised in Omsk), and plum-cherry hybrids. Representative forms of these groups and selected seedlings, grown in the gardens of the Altai region, are described.

128. HARTMANN, H., and PAPAIOANNOU, P.  
Olive varieties in California.  
*Bull. Calif. agric. Exp. Stat.* 720, 1951, pp. 56, bibl. 34, illus.

Details are given of the different strains of the 5 chief olive varieties grown commercially in California. Mission is used in the production of black-ripe and green-ripe olives and for the Greek style salt cure process. Manzanillo is used largely for the production of green- and black-ripe olives. Some, however, are processed as Spanish green fermented pickles and some are used for oil extraction. Sevillano is used mainly for canning ripe and rather less as green, fermented olives (Spanish and Sicilian types). Ascolano is generally canned ripe and is occasionally used for oil extraction. A fair quantity of Barouni is canned ripe, but more are shipped fresh to the East for home processing. It is of little value for extraction. Shorter descriptions are given of some 40 other less common varieties and of 39 types imported recently from Europe, Algeria and Turkey for tests on Mission rootstock. Data are tabulated for oil content, bearing habit, and for size and weight of fruit of different varieties.

### Propagation and rootstocks.

(See also 203d, e, q.)

129. HANSEN, C. J., and EGGERS, E. R.  
Propagation of fruit plants.  
*Circ. Calif. agric. Ext. Serv.* 96, revised 1951, pp. 57, illus.

Concise, well-illustrated instructions are given on



various methods of propagating fruit plants, by budding, grafting, cuttings, layering, suckers and runners. The first part of the circular deals with the propagation of temperate fruits, chiefly deciduous, while the second part deals with the special treatments required for certain sub-tropical fruits grown in Southern California.

130. ČIRKOV, V. I.

**Germinating the seed of apple species.**

[Russian.]

*Bot. Žurnal*, 1950, 35: 387-94, bibl. 3, illus.

The good germination shown by seeds taken from fruits which had been exposed to frost and snow during the winter is described. The results were obtained chiefly with a *Malus prunifolia* × *M. baccata* hybrid, but similar results were obtained with seeds of Mičurin's apple varieties, pears, and grapevine.

131. DEZA, M. I.

**Rooting mulberry hard-wood cuttings.**

[Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 10: 28-31, illus.

The mulberry can be propagated from hardwood cuttings previously treated with growth substances. Cuttings starting bud-growth react well to treatment with 0.01% heteroauxin. In the open, cuttings from young shoots root better than older ones.

132. HRAMOV, P. A.

**The variability of apple scions.** [Russian.]

*Sad i Ogorod*, 1951, No. 7, pp. 18-19, illus.

Trials carried out in 1946-1948 have shown that buds of scions taken from the south side of two apple varieties and worked on a Chinese rootstock have taken better and subsequently grown more vigorously than those taken from the north side of the mother trees. Shoots growing under more favourable light and heat conditions, on the south side, contained 1.31-1.51% sugar, 0.76-0.94% nitrogen and 2.64-2.67% ash, while those grown on the north side contained 0.86-0.87% sugar, 0.76-0.83% nitrogen and 3.04-3.93% ash and their buds appeared to be somewhat dwarfed.

133. RUBCOV, A. M.

**The preliminary work in nursery trials.**

[Russian.]

*Sad i Ogorod*, 1951, No. 9, pp. 10-13.

Notes on raising young fruit trees in the nurseries of the Zaporozh region of the Ukraine include the following. Seedlings for rootstocks are raised without pricking out because of the lack of irrigation, but in the autumn they are taken up, sorted, root-pruned to 15-18 cm., the stems cut back to 25-30 cm., the roots dipped in liquid manure, and the plants then put in the ground for over-wintering. After budding, the union is earthed up. After 10-12 days the soil is removed and after 18-20 days the wrapping is removed. In the winter the budded rootstocks are again earthed up. Successful "takes" recorded for apple, pear, Mahaleb cherry, apricot and myrobalan plum are 99.2, 98.1, 99.0, 98.0 and 98.7% respectively.

134. ZULAUF, H.

**Die Veredlungsunterlagen im Obstbau. (Rootstocks in fruitgrowing.)**

*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 17, pp. 4, illus.

In Switzerland, apple standards are almost exclusively worked on seedlings; for dwarf and semi-dwarf trees E.M. IX, I, II, XVI and XIII are used. For pears, seedlings and quince are used. For cherries, sweet wild cherry [*Prunus avium*] and *P. mahaleb*, for plums, Myrobalan and St. Julien, for peaches apart from seedlings mainly St. Julien and for apricots Myrobalan and St. Julien are used. Notes are given on rootstock propagation.

135. FRITZSCHE, R.

**Stand der Produktion von Veredlungsunterlagen und der Kronenbildnerfrage. (Rootstock production and frameworking.)**

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 404-11, illus.

Rootstock problems in Switzerland in general and work at Wädenswil in particular are discussed. Varieties which form an unsatisfactory crown are frameworked on an intermediate stock in the nursery.

136. TUKEY, H. B.

**Rootstocks for the apple and the pear in America.**

*Fruit Year Book 1951-2*, 1951, pp. 19-26, bibl. 15, illus.

The extensive scale of apple and pear production in America and the high yields obtained from trees on seedling stocks have served to make the rootstock problem relatively unimportant in that country. In 1930, quarantine regulations prevented the import of the widely used French crab and French pear stocks and made it necessary to use seedlings of cultivated varieties as stocks. At present seedlings of Delicious, Winesap and Rome Beauty apples and Bartlett pears are almost exclusively used commercially. These are sufficiently uniform, as a result of very severe selection, and are moderately satisfactory in nursery and orchard. The problems of winter injury and collar rot can be overcome by the use of resistant intermediate stocks, such as Virginia crab and Hibernial. Mallard apple stocks are still only being used experimentally, but they may come into favour now that the value of early bearing, short-lived orchards is being recognized. The main factor limiting their use is scarcity, for it is only in the Pacific north-west that the climate is favourable for propagation by layering. A reluctance to double work pears tends to limit the use of firelight-resistant intermediates and quince rootstocks.

137. FILINGER, G. A., and ZEIGER, D. C.

**Hardiness studies of some French crab rootstock selections.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 145-9, bibl. 8, illus.

Tests were made of the electrical resistance of twigs of 20 K series French crabapple clones now under test at the Kansas Experiment Station, 3 Mallard clones and Yellow Siberian and Manchu Crabapples which had been subjected to freezing treatment at various temperatures. Resistance fell with fall in temperature. Data from detached twigs and potted plants were compared.

C.W.S.H.

138. EMELJANOV, F. A., and MIRONOVA, L. P.

**The yield of standardized apple rootstocks in relation to the quality of the seed.**

[Russian.]

*Sad i Ogorod*, 1951, No. 9, pp. 13-15.

The advice is given that apple seeds for raising rootstocks should be selected from fruits taken from the periphery of the trees; they yield better seedlings than seeds taken from fruits lower down or inside the trees. In order to obtain favourable germination, and greatest success in the number of standardized rootstocks, the seed should be sorted according to its specific weight, and seeds of different specific gravity sown in separate plots.

139. DEVIATOV, A. S.

Some data concerning apple seedling rootstocks. [Russian.]

*Sad i Ogorod*, 1951, No. 9, pp. 15-18, illus.

A study was made of apple seedlings raised for rootstocks at the horticultural research station of the Timirjazev agricultural academy. For the experiment described, fruit was picked from a number of apple varieties at the time of technical maturity. The seeds were removed by hand when the fruits became over-ripe, stored in dry air, and then sown in two rows at a depth of 2-3 cm. in cultivated turf-podzol soil. The seedlings were not pricked out since the types of root system were to be studied, but they were thinned out at the end of June to 8-10 cm. apart. The results obtained are tabulated to show the percentage of (1) yield of seeds in relation to fruit weight, (2) seed germination, (3) seedlings in relation to number of seeds, and (4) the seedlings selected. A study was made of the various types of root systems, and of the response of the seedlings to frost.

140. UPSHALL, W. H.

Anis and Antonovka seedlings as rootstocks for four apple varieties.

*Rep. Vineland hort. Exp. Stat., Ontario, for 1949 and 1950*, pp. 21-3, bibl. 2.

The effect of two hardy seedling rootstocks, Anis and Antonovka, was compared with that of French crab seedling on four apple varieties, McIntosh, Delicious, Baldwin and Northern Spy, in a trial at the Vineland Experiment Station. After ten years in the orchard, the differences in tree size were insignificant except in the case of Delicious, which was significantly larger on French crab than on Anis. Differences in yield were also small. On the whole French crab showed a slight advantage in size of tree and yield. It also showed less variability. It is pointed out that in areas where winter killing of roots is a factor the results might be different.

141. CENTRE D'EXPERIMENTATION DE PÉPINIÈRES.

Sélection de porte-greffes. Tome I. Pomiers. (Rootstock selection. Vol. I. Apples.)

[Publ.] *Fed. nat. Hort. Prod. Pépinières fr.*, 1950, pp. 89, illus.

This publication is intended not only as a monograph for the scientist but also as a handbook to assist the nurseryman and fruitgrower in the identification and choice of common apple rootstocks. It is essentially a summary, for reference purposes, of data obtained at East Malling and Wageningen, and very many of the excellent illustrations would appear to be taken directly from Floor and Zweede's treatise on apple stocks.\* A preliminary section deals with the distinguishing characters used in identification, those of the

leaf and shoot in summer and of the buds, pulvini and leafscars in winter, and gives identification keys for summer and winter use. This is followed by liberally illustrated notes on each of the East Malling rootstocks I-XVI, listing for each stock the distinctive morphological characters, the characters by which it may be distinguished from stocks likely to be confused with it, physiological characters, ease of multiplication, and observations on its performance recorded in various parts of the world. For some of these observations no source is cited, and it would be interesting to know whether they were made at the Centre d'Expérimentation de Pépinières. The illustrations show the summer and winter habit of the stock, a leaf, a summer shoot and some details of the wood and twigs.

It is perhaps somewhat surprising that this monograph, claiming to deal with the most common stocks, should cover the whole range of East Malling stocks up to No. XVI, several of which, in this country at least are rarely if ever used, without making it clear which stocks need to be identified only for the purpose of rooting.

142. UPSHALL, W. H.

Malling IV apple rootstock.

*Rep. Vineland hort. Exp. Stat., Ontario, for 1949 and 1950*, pp. 23-4, bibl. 3.

The apple rootstock M.IV was tested under Ontario conditions on imperfectly drained sandy loam soil with the varieties McIntosh and Northern Spy. The results are considered indicative only. After nine years Northern Spy and McIntosh trees on M. IV were respectively twice and three times the size of those on M.IX. Although the trees on M.IV were later in coming into bearing than those on M.IX, and no earlier than those on M.I and M.II, their total yield up to the ninth year was much higher than the others. Root anchorage, however, was very poor.

143. SCHULTZ, J. H., and GRAVES, H. A.

The effect of Dolgo crabapple upon hardiness of Malling apple stocks.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 142-4, bibl. 3, illus.

Malling stocks have not proved hardy when used with large-fruited apple varieties in the Northern Great Plains. An experiment showed that when Malling stocks I, IV, V, VII, IX, X, XIII, and XVI were budded with Dolgo Crab, they remained uninjured through five winters. With M.IX there was appreciable enlargement of stock over scion. C.W.S.H.

144. HOLBECH, J. A.

Apple trees succeed on their own rootstocks.

*Agric. Gaz. N.S.W.*, 1951, 62: 374.

Apple trees on their own rootstocks, in a long-term experiment at Bathurst Experiment Farm, have for the most part made outstandingly better growth than trees on Northern Spy. With the exception of Granny Smith, all varieties growing on their own stock have so far produced almost as much, and in some cases more fruit than similar trees on Northern Spy.

145. UPSHALL, W. H., and DICKSON, G. H.

Mahaleb and Mazzard rootstocks for the cherry.

*Rep. Vineland hort. Exp. Stat., Ontario, for 1949 and 1950*, pp. 15-20, bibl. 4.

\* Floor, J., and Zweede, A. K., Handleiding voor de determinatie van appelonderstammen. [Publ.] N.A.K. Wageningen, 1937 (H.A., 7: 1523).



The results of a number of trials in commercial orchards and at the Vineland Experiment Station are summarized as follows: "On soils which show little mottling in the subsoil, indicating reasonably good internal drainage, Mahaleb rootstock has given a larger and more productive sweet-cherry tree. Where drainage is questionable, Mazzard rootstock has resulted in trees of longer life but not necessarily larger or more productive. Under these conditions trees on both rootstocks may prove unprofitable. On a very limited test, Malling clonal F12/1 (Mazzard) appeared to give a slightly larger tree than the Mazzard seedlings compared with them."

146. DELMAS, H.-G.  
Identification de porte-greffes du pêcher a l'aide de fragments de racines. (Identification of peach rootstocks by means of root fragments.)  
*Rev. hort. Paris*, 1951, 123: 522-5, bibl. 6, illus.

A study was made of the root characters of mature trees of the three chief peach rootstocks, *Prunus insititia*, peach and almond, in an attempt to find a method of identifying the rootstock of a grafted tree in the field. The external and internal root characters of the three species are described in detail with the aid of photographs, only characters visible to the naked eye or with a magnifying glass being considered. It is shown that *P. insititia* can be readily distinguished from the other two, while peach and almond can be distinguished with care, especially by the character of the lenticels. It has not been found possible to distinguish peach  $\times$  almond hybrids from their parents, nor between the two forms of *P. insititia*, i.e. Damas and St. Julien.

147. UVAROV, F. Z.  
Amelanchier as a rootstock for pear.  
[Russian.]  
*Sad i Ogorod*, 1951, No. 9, pp. 19-20.

In a search for dwarfing and semi-dwarfing stocks for pears, seedlings of "irga kolosistaja" [*Amelanchier spicata*] (a form very resistant to frost) were raised and tested as rootstocks for a number of pear varieties, with favourable results in most cases. It is advised that pears on amelanchier rootstocks should be planted in places sheltered from winds, and grown as prostrate forms or as cordons.

148. BURMISTROV, A. D.  
The sand cherry as a rootstock for the plum.  
[Russian.]  
*Sad i Ogorod*, 1951, No. 9, pp. 21-3, illus.  
The sand cherry [*Prunus pumila*], as a dwarfing rootstock, is compatible with some varieties of plum but not with others.

#### Pollination.

(See also 203j, 1064, 1082.)

149. ŠAĬTAN, I. M.  
The effect of the conditions under which flowers develop on the quality of their pollen. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 579-82, bibl. 2, illus.  
Pollen from apple flowers on the south and west sides

of trees was more potent in setting fruit than that of flowers from the north and east sides. The germination of pollen (apricot, peach, rose, tobacco) from flowers of different ages was not the same; good results were obtained with pollen taken from flowers in the early and full stages of flowering, but that from flowers of a late stage gave no, or insignificant, germination. In apricot and peach the pollen of flowers towards the middle and base of a branch was of better quality (based on size of grain) than that of flowers borne towards the upper end.

150. HARITONOVA, E. N.

The relation between fruitfulness and the viability of the pollen in acid cherries, sweet cherries and their hybrids. [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 8: 25-33, bibl. 8.

Artificial pollination of acid-sweet cherry hybrids showed complete correlation between the degree of viability of the male and female reproductive elements in the hybrids. Varieties of sweet and acid cherries not of hybrid origin showed about 100% viable pollen. Hybrids of acid cherry origin had 50 to 90% viable pollen, but among them as many were fruitful as in the varieties having 100% viable pollen. Acid-sweet cherry hybrids having 50% or more viable pollen were also fruitful. In those with 30-50% viable pollen yield was moderate, and hybrids with 0-30% viable pollen were sterile or bore few fruits.

151. SCARAMUZZI, F.

Ricerche sulla biologia florale e di fruttificazione del cotogno. (Research on the floral and fruit biology of quinces.) [English summary ½ p.]

*Ann. Sper. agrar.*, 1951, 5: 543-57, bibl. 13.

The author's work at Florence in 1949 and 1950 shows that not all quinces are self-fertile. Three out of six varieties tested by him proved self-sterile. The other three, moreover, showed increased fruit set when cross-pollinated. All varieties tested showed a high percentage of viable pollen. No parthenocarpically developed fruit were found.

#### Growth phenomena.

(See also 203o.)

152. EGGERT, F. P.

A study of rest in several varieties of apple and in other fruit species grown in New York State.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 169-78, bibl. 9.

Cuttings were taken from trees of 4 early, 4 midseason and 4 late varieties of apple and were placed first in moist sand and later in water in quart jars in a greenhouse. Trees or bushes of pears, cherries, peaches, prunes, grapes, raspberries, blackberries, currants and blueberries were also kept in a greenhouse. It was noted that the taking of cuttings from apple trees hastened the bud activity of these trees. The breaking of the rest period was shown to be a gradual process. Raspberries and blackberries were the first to break rest, while apples, grapes and blueberries were last. Time of breaking of rest appeared to be correlated with blooming. There was a correlation between

bud activity and accumulated hours of exposure to temperatures below 45° F. Flower buds required less exposure to low temperature before breaking than did leaf buds, and terminal and spur buds required less exposure than lateral buds. On any given date in the winter or spring there was a higher percentage of active buds on the apple cuttings than on the trees from which cuttings were taken. It was concluded, however, from observations on bud activity, that the act of taking cuttings did not contribute markedly towards the breaking of rest of cuttings. C.W.S.H.

153. SERGEEV, L. I.

A biological analysis of the yearly cycle of development in fruit plants. [Russian.]

*Priroda*, 1951, 40: 6: 48-9.

In experiments with young peaches, plums and figs, one set of plants was kept, during winter, at a temperature which did not fall below 12° C., and another set, as control, at a temperature which was generally below 10° C. Of the plants at the higher temperature the fig continued to develop and behaved as an evergreen; the drupaceous plants, however, went into a resting period but the next spring they did not blossom normally, most of the flower buds falling off. It is concluded that, for the normal development of flower buds, peaches require a low temperature for about 3 months in their yearly cycle, and plums for not less than 2 months.

154. TRECCANI, C. P.

Ricerche sulle fluttuazioni e sugli spostamenti delle riserve carboidrate e azotate delle radici e della chioma di giovani alberi di melo. (Research on the changes in and displacement of the carbohydrate and nitrogenous reserves in the roots and foliage of young apple trees. (Preliminary Note.)) [English summary 1/2 p.]

*Ann. Sper. agrar.*, 1951, 5: 337-58, bibl. 21.

Work at the Milan Horticultural Research Station in the years 1947-1949 concerned the changes in carbohydrate and nitrogen content in 3-year-old apple seedlings and in 7-year-old grafted Jonathan apple trees. Among conclusions reached are: (1) In young seedlings the accumulation of carbohydrate reserves occurs very much earlier in the roots than in the crown. (2) The reserves in the roots are not used by the crown during growth renewal. (3) There is a much larger total carbohydrate content percentage in the roots. Of the reserve materials starch varies most, thereby showing that it is the most important of them. (4) Removal of bark initially results in a greater increase of carbohydrates in buds and leaves than in branches and trunk. (5) Suppression of above-ground parts, as by bark removal above the collar, during the period of new growth completely stops root development. (6) In the roots of young apple trees about to come into bearing there is little fluctuation in carbohydrate content, unlike the considerable variation in young seedling roots in the spring. (7) The phenomenon of winter hydrolysis of starch and synthesis in early spring characteristic in the crown is not seen in the roots. (8) A hailstorm in July, causing 70% leaf fall, slightly reduced carbohydrate content in the roots. (9) Nitrogen content in the roots varies slightly during the year with a marked increase in protein and mineral

nitrogen in the months before and during budbreak and flowering.

155. ROBIN, F., AND DE L'ECLUSE, R. B.

Une échelle de végétation du pommier. (A growth chart for apple trees.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 377-9.

In this discussion on the length of the period between blossoming and time of picking, tables are given showing the number of days from full bloom to time for picking the fruit of a number of apple varieties.

156. MORETTINI, A.

Ulteriore contributo allo studio dell'aborto dell'ovario nel fiore dell'olivo. (A further contribution to the study of ovary abortion in olive.) [English summary 1 p.]

*Ann. Sper. agrar.*, 1951, 5: 309-29, bibl. 28.

A brief discussion of the subject is followed by a description of the author's own recent investigations into the rate of abortion occurring in different olive varieties in central Italy. He finds that each variety shows a specific percentage of abortion under normal circumstances. Attempts were made to influence abortion by fertilizer treatment and by artificial defoliation. The fertilizer treatment had no effect. Defoliation in March, on the other hand, caused up to 100% abortive flowers. He concludes that deviation from the normal percentage of abortion in any variety is a clear indication of the state of health or nutrition of a tree and should be used as such.

157. BÓTTARI, V.

Quattro anni di infruttuose osservazioni sull'aborto dell'ovario nel fiore dell'olivo. (Four years of unfruitful observations on olive flower abortion [in Sicily].) [English summary 21 lines.]

*Ann. Sper. agrar.*, 1951, 5: 359-76.

Results achieved on different plants of particular varieties when tabulated and submitted to theories previously evolved give contradictory answers. All varieties except a few trees of Francofontese and Frantoio, which show a floral abortion of less than 10%, show percentages of abnormal flowers which vary greatly in the same variety and even in the same tree. The author concludes that both climate and previous production affect the incidence of abortion and points out the necessity for continuing observations on the behaviour of particular plants, with the aim of determining the relations of amount of abortion, type of flower, premature fall of flowers and cropping.

158. MORETTINI, A.

Influenza della defogliazione anticipata su la fioritura e la fruttificazione dell'olivo. (The influence of early defoliation on flowering and fruiting in the olive.)

*Ann. Sper. agrar.*, 1951, 5: 457-79, bibl. 14.

Premature leaf fall in olive during the winter due to various agents but particularly to the fungus *Cycloconium oleaginum* is frequent and results in loss of crop. The author describes trials in which he defoliated trees of three olive varieties between December and the end of March. When defoliation took place before the end of February no flowers appeared and only leaf buds were formed. When defoliation took place a little later, i.e. before the end of March, normal



flowering was not prevented, but the ovary did not develop fully and fruit did not set. Where only small branches were defoliated the same phenomenon was seen on a smaller scale. The actual dates of effectiveness of defoliation vary with different varieties. The importance of preventing premature defoliation especially that due to *C. oleaginum* is stressed.

159. BRADT, O. A.

Variation in natural drop of peach varieties.  
*Rep. Vineland hort. Exp. Stat., Ontario, for 1949 and 1950*, pp. 24-7, bibl. 1.

The natural drop in peaches was found to be variable from year to year and from one variety to another. Since the June drop is usually completed in Fisher, Halehaven and Veteran before Oriole, Golden Jubilee and Elberta, thinning should start with the former varieties. Once a peach stops growing before the June drop is completed it will eventually drop off. Veteran retained, as fruits, a much higher percentage of its blossoms than Golden Jubilee, and thus required more thinning. [Author's summary.]

160. BAKER, G. A., and DAVIS, L. D.

Growth of the cheek diameter of peaches.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 104-10, bibl. 10.

It is shown that the periods of rapid, slower, and rapid growth of the peach fruit can be represented by two typical growth curves. The first curve depicts the period of growth, by cell division and enlargement, of the pits and flesh of the fruit. The second curve depicts a swelling of the flesh which is thought to be primarily due to increases in cell size. C.W.S.H.

161. FALCH, J.

Die Kirkes-Blüte als morphologische Sonderheit. (The exceptional morphology of the Kirke flower.) [English summary 6 lines.]  
*Mitt. Klosterneuburg*, 1951, 3:111-14, illus.

In the plum variety Kirke, flowers with up to eight styles occur, but only normal flowers develop into ripe fruits. The percentage of blossoms with supernumerary styles varied from 84% in 1946 to 20% in 1951.

*Fertilizers and soil management.*

(See also 60, 203a, f.)

162. REYNTENS, H., and COTTENIE, A.

Recherches sur l'assimilabilité des engrais chimiques appliqués en sillons dans les vergers à hautes tiges. (Investigations on the assimilation of chemical fertilizers applied in furrows in standard orchards.) [English and German summaries,  $\frac{1}{2}$  p. each.]  
*Rev. Agric. Brux.*, 1950, 3: 1040-6, illus.

A complete chemical fertilizer was applied in March to a grass orchard in furrows 20 cm. deep and at a distance from the trunks of half the width of the crown. Analyses of the soil taken at various intervals subsequently showed that a large proportion of the fertilizer had not been utilized even by harvest time. There was no horizontal movement of nutrients. After the second cutting, the grass over the furrows appeared scorched and made poor growth.

163. PRIIMAK, A. K.

Selective relations of roots to manuring.  
[Russian.]

*Sad i Ogorod*, 1951, No. 10, pp. 40-2, illus.

A manurial experiment with pairs of 9-10-year-old trees of apple, pear, plum and cherry was carried out as follows. In early spring five roots of each tree were uncovered, cut back, and each cut end placed in a box 50 x 40 x 30 cm. containing soil with a particular manure mixture, and the box then put in the ground in place of the part of the root cut away and the whole ground levelled. The manures were various combinations of organic manures for one tree of each pair, and mineral fertilizers for the other. In October the boxes were dug out, the roots examined and their length recorded. The results showed that the reaction of the pear trees was different from that of the others in that, whatever the manure, the roots had made little or no growth. The other trees, notwithstanding the dry weather that year, produced vigorous root systems.

164. HAVIS, L., and GILKESON, A. L.

Interrelationships of nitrogen and potassium fertilization and pruning practice in mature peach trees.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 24-30, bibl. 13.

In an orchard in which no potassium deficiency symptoms were visible, applications of potassium fertilizers increased yields over a five year period, these increases being due to a higher percentage set and larger fruits. Where trees were moderately pruned, nitrogen, with or without potassium, had no effect on yield. Moderately pruned trees gave higher yields, and with low potassium fruit ripened earlier than that on trees heavily pruned and with high potassium. Heavy pruning increased leaf potassium; nitrogen applications reduced it. Leaf potassium usually declines as the season advances. C.W.S.H.

165. FORD, H. W., and JUDKINS, W. P.

The effect of cultural and nitrogen treatments on the rate of respiration and certain indices of maturity of Halehaven peaches.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 73-80, bibl. 4.

Peaches are grown in Ohio either under cultivation or under sod, the latter system being increasingly practised to reduce erosion. Under the sod system it was found that increasing applications of ammonium sulphate increased the rate of respiration of the fruit, the pericarp green pigment and the titratable acidity. Delay of maturity is of practical importance to fruit-growers. Under the sod system applications of sulphate of ammonia in excess of 0.1 lb. N per year of tree's age were shown to be detrimental to ripening. An application of 0.05 lb. N under the cultivation system gave a higher respiration rate, more green pigment and more titratable acid than a similar application under the sod system. C.W.S.H.

166. WOODS, J. J.

Green manuring, cover cropping and mulching.

*Mimeo. Saanichton Domin. exp. Stat.* 119, 1950, pp. 8.

An interesting account for the grower of the rational

use of green manuring, cover cropping and mulching in Vancouver Island B.C., and of current work on the subject at Saanichton.

167. PREW, H. A.

Cover crops and mulching in the home orchard.

*N.Z. J. Agric.*, 1951, **82**: 491-2, illus.

The blue lupin (*Lupinus angustifolius*) is the most popular cover crop in New Zealand. Vetches, partridge peas, Dunn peas, tick beans, and broad beans have many of the good qualities of lupins, though usually they do not produce quite the same bulk of material. Non-leguminous plants commonly used as cover crops are oats, rye, barley, wheat and mustard. Mulchings of lawn clippings, straw, or light hedge clippings applied from late spring to early autumn help to conserve moisture; they should be worked into the soil in autumn. The roots of citrus trees tend to rise into the mulch as it decays, hence cultivation around citrus trees in autumn should be light—no more than 2 to 3 in. deep.

168. CONWAY, T.

Adding humus to orchard soils in Hawkes Bay.

*N.Z. J. Agric.*, 1951, **83**: 51-7, illus.

The various forms of mulching, and useful cover crops for orchards are discussed.

169. SHIBUKAWA, J.

Soil erosion in sloping apple orchards and its control in Aomori. [Japanese with English summary 2 pp.]

[*Publ. Aomori Apple Exp. Stat.* 1951, pp. 36, bibl. 2 pp., illus.

The author first points out the very serious loss definitely attributable to erosion in this apple district and then gives notes for prevention of future loss. Where erosion has already gone far he recommends that legumes shall not be grown but that both organic matter and fertilizer should be added to the soil, that straw mulch should be used and rye should be sown as a green manure crop. For orchards not so far gone he recommends the sowing of clovers, especially red and white, broadcasting on the slope. "Trashy cultivation" of white and ladino clover is also advised on sloping orchard land. For such crops the use of lime and fertilizer is advisable.

170. HARLEY, C. P., MOON, H. H., AND REGEIMBAL, L. O.

The release of certain nutrient elements from simulated orchard grass mulch.

*Proc. Amer. Soc. hort. Sci.*, 1951, **57**: 17-23, bibl. 5.

The better growth made by apple trees under a good hay mulch than by trees mulched with wheat straw and given supplementary N applications indicated that, apart from its physical effects, the manurial effects of a mulch are considerable and vary greatly with the type of mulch given. A study was made of the decomposition of high- and low-nitrogen orchard grass hay not in contact with the soil but exposed to normal rainfall over a period of a year and 8 days. Leached material was collected and analysed and the residue was analysed at the end of the period. Low-nitrogen hay lost 77%

of its dry matter, high-nitrogen hay lost 85%. At the end of the experiment 36% of the N originally present was lost as gaseous nitrogen from high-nitrogen hay, while there was no significant loss from low-nitrogen hay. Details are given of the release of other elements from the two hays, and it is concluded that orchard grass mulch provides a substantial supply of nutrients for orchard trees, provided the N content is relatively high. C.W.S.H.

### Pruning and training.

(See also 203g.)

171. ROLIN, P.

Quelques aspects évolutifs de la culture fruitière commerciale. (Some aspects of commercial fruitgrowing.)

*Fruit belge*, 1951, **19**: 33-7, 107-11, 140-5, illus.

A well-illustrated account of systems of pruning and training with particular reference to the fruit "hedge".

172. MONIN, A.

Le buisson à centre ouvert différé. (Delayed open-centre bush trees.)

*Fruit belge*, 1951, **19**: 89-93, illus.

Bush types of apple trees are compared—open centre, pyramid, and the modified leader or delayed open centre—and the author suggests for Belgian conditions the use of a modified form of the American delayed open centre for trees on East Malling rootstocks.

173. ŽUČKOV, N. G.

Shaping fruit trees. [Russian.]

*Sad i Ogorod*, 1951, No. 8, pp. 16-20, illus.

This account of shaping fruit trees has special reference, in the first place, to two prostrate forms which can be covered for protection in winter; they are illustrated and described as the prostrate cordon and the prostrate spindle. Forms of bush trees, a combination system of shaping recommended for the Crimea and other southern parts of the U.S.S.R., and a method of branch thinning are also described.

174. TRUSEVIČ, G. V.

The technique of forming an open crown in the nursery. [Russian.]

*Sad i Ogorod*, 1951, No. 10, pp. 16-23, illus.

Methods are described in detail for forming open heads in young fruit trees by thinning out branches and spacing the others at different levels; the branches are trained more or less horizontally by attaching them to lower parts of the tree or by "stretchers"—rods so placed as to push outwards the upwardly inclined branches.

175. DEKKER, P.

Nieuwe vorm van fruitteelt in Italië. (A new way of cultivating fruit trees in Italy.)

*Cult. Hand.*, 1951, **17**: 490-1, illus.

This article consists of notes by a Dutch fruitgrower on certain Italian methods of training trees, on varieties grown, and on disease control. Training includes the "Ferrara method" in which the central axis (of apple trees on M. 1) is retained with the lateral branches trained out from it at various heights, 70 cm. apart, the lowest being curved out horizontally and kept in position with bamboo canes.



176. LECOYER, M.

La taille de formation et de fructification des poiriers et pommiers. (*Training and pruning of pear and apple trees.*)

*Courr. hort.*, 1951, 13: 391-2, illus.

This article discusses the "Lepage" method of training young fruit trees, and forming regrafted trees. In the Lepage method one-year-old trees are planted at an angle of 40° and later curved to form an arc with its highest part 50 cm. above the ground.

177. HOBBS, E. W.

*A method of pruning and training cordon apple trees.*

*Fruit Year Book 1951-2*, 1951, pp. 44-8, illus.

An unconventional method of training cordon apple trees is described which has been tested at Long Ashton Research Station over a period of 4 years, the aim being to expand the cordon laterally as well as lengthwise. The method involves tying down some of the laterals in July and August to induce the development of replacement wood at the base and blossom buds along the rest of the shoot. Considerable thinning out of laterals and rubbing out of blossom buds is required during the winter pruning, and some summer pruning of extension growth is done. The method should only be attempted with strongly growing trees and it is important to prevent fruiting along the actual cordon stem. The author considers the method worthy of further trial, especially in the humid conditions of the south-west of England.

178. HOLBECHE, J. A.

*Pruning the Packham's Triumph pear to develop a sturdy frame and control spurs.*

*Agric. Gaz. N.S.W.*, 1951, 62: 356-8, 376, illus.

"Packhams" is the most popular and widely grown dessert pear variety in New South Wales. It produces fruiting spurs readily and comes into bearing at an early age, but the framework does not always develop as strongly as desired, and, although much of this trouble can be attributed to the influence of rootstocks, some is due to faulty pruning. Advice is given on developing the framework, pruning for fruit production according to tree vigour and age, spur pruning, and topworking to Packham's Triumph.

179. VINEY, R.

*Pruning young peach trees: method designed to encourage maximum crop of fruit.*

*Orchard. N.Z.*, 1951, 24: 5: 3-7, illus.

During the first few years after planting, pruning should be done with the object of developing a balanced, well-shaped tree, with a maximum of fruit-bearing wood. Methods which should be employed in the first, second, third, fourth to sixth, and future years are described. Pruning cuts which exceed about one inch in diameter should be covered with a sealing compound to prevent the entrance of wood-rotting fungi and silver-leaf spores. One illustration is of a well-shaped tree four years after planting showing the heading-out of leader points to spread the tree.

180. KOČETOVA, N. P.

*A young-growth method of growing the fig.* [Russian.]

*Sad i Ogorod*, 1951, No. 8, pp. 48-50.

The fig can be grown in Middle Asia, but precautions must be taken on account of its susceptibility to winter injury, and a recommended method is described. In the year of planting the plant is allowed to grow without interference. In winter it is covered with a layer of 15-20 cm. of soil. In the following spring the soil is removed and the plant cut down to a stump in order to induce the development of shoots from the base. Of these, 7-10 are retained (being later reduced to 4 or 5) for fruiting, the others are removed. New shoots arise from the stump, and the operation is repeated with these. Thus a bush consists of two kinds of growth: the one-year-old fruiting shoots and the current year's shoots. Yields for 5 varieties are given for plants headed back and others not so treated, to the advantage of the former.

181. RIERA, F. J.

*La poda del olivo en Cataluña. (Olive pruning in Catalonia.)*

[*Publ.*] *Obra social agric.* 18, 1951, pp. 14, illus.

Three types of tree form are commonly found in the olive groves of Catalonia: the symmetrical tree, the free-growing tree and the multiple-stem tree. The choice of form is determined by local tradition rather than by the specific needs of the tree. The fundamental principles of olive pruning to obtain maximum yields and regular bearing are discussed, and it is concluded that an open vase-shaped tree is the most desirable form while the exact type and severity of pruning must be determined by the habit of the variety and the environmental conditions. A method of applying a rational system of pruning to old trees is outlined.

### *Spraying for cultural purposes.*

(See also 284, 285.)

182. STRUCKMEYER, B. E.

*Thinning apples with chemicals.*

*Wis. Hort.*, 1951, 41: 168-70, illus.

The amount of blossom usually characteristic of a variety determines the concentration of the thinning chemical to be used. Results of trials in Wisconsin in 1950 with App-L-Set (sodium NAA) have shown that reliance cannot be placed on the recommendations of the manufacturers. In all cases a higher concentration was necessary.

183. BROUGH, C. R.

*Blossom-thinning sprays for apples: a progress report.*

*J. Dep. Agric. Vict.*, 1951, 49: 451-4, 458.

Promising results were obtained by blossom-spraying (at or just after full bloom) with naphthaleneacetic acid, generally at 10 p.p.m. but for Jonathan and Delicious at 7.5 p.p.m., and with DNC at 0.2 to 0.4%.

184. VAN CAUWENBERGHE, E.

*Résultats de l'emploi des hormones contre la chute de fruits et de quelques autres applications. (Results of using hormones to control fruit-drop, and their use in other ways.)*

*Fruit belge*, 1951, 19: 94-6.

A review of the uses of hormones in horticulture, with

a list of apple and pear varieties showing their reaction to treatment with  $\alpha$ -naphthaleneacetic acid.

185. EDGERTON, L. J., AND HOFFMAN, M. B.  
The effectiveness of several growth regulating chemicals in delaying the harvest drop of the McIntosh apple.\*  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 120-4, bibl. 6.

Naphthaleneacetic acid, commonly used to delay pre-harvest drop of apples, has only a short period of effectiveness. 2,4,5-trichlorophenoxypropionic acid (trithanolamine salt) was shown to be very effective in delaying the abscission of leaf petioles, and was therefore tested, together with three 2,4-D compounds, for its effectiveness in delaying harvest drop when applied 26 and 12 days before the application of naphthaleneacetic acid to other trees. The results showed that as good control was obtained by these early applications of 2,4,5-trichlorophenoxypropionic acid as by the later naphthaleneacetic acid application. The 2,4-D applications were ineffective. C.W.S.H.

186. HARRIS, W. B.  
Pre-harvest drop of pears.  
*J. Dep. Agric. S. Aust.*, 1951, 54: 593-5, bibl. 2.

There was no significant difference between the effects of properly timed spraying of Williams pear trees with 2,4-D at 5 p.p.m. and with ANA at 10 p.p.m. Both were effective but 2,4-D remained effective for 5, ANA for 3 weeks only.

187. OSBORNE, D. J., AND WAIN, R. L.  
Studies on plant growth-regulating substances. III. The production of parthenocarpic pomaceous fruits by chemical treatment.  
*J. hort. Sci.*, 1951, 26: 317-27, bibl. 12, illus.

An account is given of investigations on the production of seedless pomaceous fruits after applying synthetic growth-regulating substances. A wide range of compounds was studied, and mature seedless fruits from emasculated flowers of certain varieties of pear were obtained by applications of  $\alpha$ -(2-naphthoxy)propionic acid at 100 p.p.m. Preliminary experiments indicate that  $\alpha$ -phenoxypropionic acid at 100 p.p.m. can be effective on Bramley's Seedling apples. The best results were obtained by applying, at 3-day intervals, 5 single successive sprays containing the compound.—Wye College.

188. MARTH, P. C.  
Wirkung von 2,4,5-Trichlorophenoxyessigsäure auf die Reifung von Äpfeln und Pfirsichen. (The effect of 2,4,5-trichlorophenoxyacetic acid on the ripening of apples and peaches.)  
*Ber. wissenschaftl. Biol.*, 1951, 71: 72.

An 0.01% 2,4,5-T spray some weeks before harvest accelerated the ripening of medium late apples. Higher concentrations burned the leaves and disturbed shoot development the following year. Premature spraying of peaches resulted in stunting of fruit. O.J.

\* See also H.A., 21: 3298.

189. WEINBERGER, J. H.  
Effect of 2,4,5-trichlorophenoxyacetic acid on ripening of peaches in Georgia.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 115-19, bibl. 2.

2,4,5-T was applied at concentrations of 10 to 40 p.p.m. up to 52 days before harvest. The earlier the application and the greater the concentration, the greater was the effect in advancing fruit maturity. Advanced maturity was accompanied by fruit distortions, poor size and colour, and reduced firmness and quality. Low concentrations, applied early, produced more distortion than high concentrations applied later. Concentrations of 40 p.p.m. injured foliage and terminal growth. C.W.S.H.

190. FEDOROV, M. A.  
A trial to hasten the ripening of figs. [Russian.]  
*Sad i Ogorod*, 1951, No. 8, pp. 50-2, illus.

Certain varieties of fig would be suitable for cultivation in the sub-tropical regions of the U.S.S.R. if only they ripened earlier. Their late ripening affects their quality adversely for their use as fresh fruit and also for processing. Trials are described to ascertain the effect of applying olive oil to the "eye" of the inflorescence or of the fruit. The treatment hastened ripening by 15-20 days. It was most effective when applied at the time that the seeds were developing.

### Grading and storage.

(See also 479.)

191. LOEWEL, E. L., AND SCHEIL, W.  
Welche Sortiermaschinen stehen dem niederelbischen Obstbau für die Kernobsternte zur Verfügung? (Grading machines for pome fruits at the disposal of the Lower Elbe fruit industry.)  
*Mitt. ObstbVersuchsrings Jork*, 1951, 6: 98-107, illus.

Specifications are given of 7 German fruit graders with their respective prices and names of manufacturers.

192. COOPER, C. E. B.  
A cold store for fruit.  
*Food Pres. Quart.*, 1951, 11: 1-6, illus.

Very satisfactory results were obtained in South Africa from a modified cold store for deciduous fruits, which differs from the conventional design in having a pre-cooling tunnel in the centre of the building and the whole installation being operated by one air-cooler and fan. By this "gyratory" system it is possible to provide rapid pre-cooling and increase the storage accommodation by about 16% as compared with the usual system of coolers for each chamber.

193. KIDD, F., AND WEST, C.  
The storage of late dessert apples.  
*Agriculture, Lond.*, 1951, 58: 276-8.

This is a preliminary account of a 3-year investigation at Ditton which will be reported in greater detail later in a Technical Paper of the D.S.I.R. London. Of 20 dessert apples tested at 37° F. and 31° F. the most promising home-grown varieties were Barnack Beauty, Belle de Boskoop, D'Arcy Spice, Tydeman's Late Orange and Winston. These as well as Glockenapfel



were kept at 37° in good condition until March or April. The last four named also kept well at 31° F. but the advantage gained over 37° F. treatment was small. Fruit gathered about a fortnight later than usual kept equally well at 37° F. and was ready for marketing at about the same date as that picked at the normal time. Its quality, weight and size were superior. Against this must be placed the danger of damage by birds and wind.

194. SMOCK, R. M., AND GROSS, C. R.  
Respiration and ripening of apples in air purification studies.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 81-93, bibl. 7.

Techniques are described whereby the atmosphere around stored apples can be treated for the removal of volatiles without CO<sub>2</sub> accumulation or O<sub>2</sub> depletion; and whereby "controlled ventilation" can be used to regulate the accumulation of gases evolved by the fruit in order to study the effect of activated carbons on the removal of fruit volatiles. Certain objections to these techniques are mentioned. Seventeen experiments were carried out. Brominated carbon delayed ripening while activated coconut shell carbon did not. This result suggested that other volatiles as well as ethylene stimulate ripening in pre-climacteric fruit. Untreated coconut shell carbon delayed softening rate and reduced respiration rate. C.W.S.H.

195. ULRICH, R., AND MARCELLIN, P.  
Action de l'éthylène et de quelques produits organiques volatils sur la maturation des poires. (The action of ethylene and certain organic volatile substances on the ripening of pears.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 77-80.

Of all the substances tested ethylene was the only one which hastened the ripening of pears. The others inhibited the process or were even toxic.

196. WILSON, E. E.  
Effect of isopropanol, as a constituent of a glyoxalidine fungicide, on the ripening of Bartlett pears after harvest.  
*Plant Dis. Repr.*, 1951, 35: 38.

Isopropanol was the constituent of a preparation containing ½% of a glyoxalidine formulation known as 341C, responsible for the increase in the rate of ripening of Bartlett pears dipped in the preparation.

197. CARLONE, R.  
Ricerche sperimentali sulla perdita in peso durante la conservazione delle mele. (Weight loss in stored apples.) [English summary 12 lines.]  
*Ann. Sper. agrar.*, 1951, 5: 617-40, bibl. 5.

High temperature and low humidity result in considerable loss of weight. Optimum conditions observed for certain varieties ranged from +4 to +12° C. at a relative humidity of 89 to 94%. Thin skinned and scabby fruit tended to lose weight more than thick-skinned, clean fruit. Losses were greatest on small fruits. Where the apples were grown did not affect loss of weight in store.

198. COMIN, D., AND TING, S. V.  
Scald, firmness, soluble solids and acidity in Rome Beauty apples as affected by time of harvest in three orchards.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 95-100, bibl. 1.

Rome Beauty apples were harvested every 7 days from 20 September to 25 October, 140 to 175 days respectively from full bloom. The harvesting was carried out in three localities in Ohio. The apples were stored in refrigerated rooms with air-purification equipment. All fruits harvested 147 days from full bloom or earlier showed scald in February, except those from one locality where vigorous trees had produced better "over-coloured" apples. Apples harvested in all localities 160 days after full bloom showed little or no scald. Scald was also affected by the type of container and the length of storage. Variations in firmness, ground colour, total soluble solids, pH and titratable acidity due to different harvesting dates were not great. C.W.S.H.

199. PADFIELD, C. A. S.  
Superficial scald on New Zealand Granny Smith apples—the period of greatest susceptibility.  
*N.Z. J. Sci. Tech. Sec. A*, 1951, 32: 3: 45-7, bibl. 1.

Wrapping treatments with Granny Smith apples during the first 24 weeks of cool-storage showed that, irrespective of fruit maturity, scald susceptibility increased from the first to the twelfth week and then decreased until the twenty-fourth week.—D.S.I.R., Havelock North, N.Z.

200. WOODHEAD, C. E.  
Low-temperature breakdown in Sturmer and other apple varieties.  
*Orchard. N.Z.*, 1951, 24: 3: 14-18, bibl. 12, illus.

The author reviews present knowledge on low temperature breakdown in apples and suggests the following measures for controlling it in the Sturmer apple: (1) Storage at a temperature of 38° F. (2) After a cool summer it is of particular importance that this temperature be regarded as the absolute minimum for safety. (3) Late picking should be avoided at all times. (4) In cool summers fruit should be picked at the earliest date consistent with maturity. (5) Place fruit in cool store as soon as possible after harvesting. (6) Avoid long-term storage of fruit from light crops. (7) In the orchard a balanced manurial programme should be maintained; excessive use of nitrogenous manures is especially to be avoided.

201. PADFIELD, C. A. S.  
The effect of periods of pre-storage delay on the ground-colour and cool-storage disorders of Granny Smith apples in cool store. II. Core flush, breakdown and fungus.  
*N.Z.J. Sci. Tech. Sec. A*, 1951, 32: 2: 25-7, bibl. 1.

Core flush and senescent breakdown of Granny Smith apples can be controlled by holding the fruit for six weeks before cool storage, but other factors prohibit

the adoption of this treatment in practice. Primary fungus infections, which cause serious losses in long-term storage, were controlled by storing fruit immediately. Secondary infections which are not normally a serious cause of loss were worst on fruit with which there was no delay before storage.—D.S.I.R., N.Z.

202. WINKLER, W. O.

**Report on decomposition of fruits and fruit products.**

*J. Ass. off. agric. Chem. Wash.*, 1951, **34**: 506-12, illus.

Recommendations are made relating to the determination of galacturonic acid, which is a valuable criterion of decomposition in fruits and fruit juices. Data are tabulated on quantities of the acid found in and recovered from apple juice, orange juice and apples.

*Noted.*

203.

a BITTNER, C. S.

**Soil management in Pennsylvania orchards.**  
*Circ. Pa. agric. Ext. Serv.* **381**, 1951, pp. 8.

b ESKEW, R. K., and others.

**Frozen concentrated apple juice.**  
*Industr. Engng Chem.*, 1951, **43**: 2397-2403, bibl. 9, illus.

c GRILL, F., and BACHMANN, I.

Untersuchungen über den Vitamin-C-Gehalt der österreichischen Obstarten und-sorten bei Baumreife, Lagerung und Konservierung. (Vitamin-C content of tree ripe, stored and preserved Austrian fruit species and varieties.) [English and French summaries, 3 lines each.]  
*Mitt. Klosterneuburg*, 1951, **1**: 66-73, bibl. 4.

d HILKENBÄUMER, F.

Verwendungsmöglichkeiten von Malus IX (Gelber Metzger Paradies). (Uses of Malus IX.)  
Reprinted from *Neue Berl. Gärt.-Börse*, 1950, No. 45/46, p. 1.  
As rootstock for spindle bushes.

e KARNATZ, H.

Aus der Obstbauversuchsanstalt Jork: Die Schnittprobe als Keimprüfungsmethode bei Obstsämereien. (Testing by cutting as a method of determining the germination capacity of fruit seeds.)  
*Mitt. ObstbVersuchsanstalt Jork*, 1951, **6**: 131-2, bibl. 1.  
Method found unreliable.

f MAGNESS, J. R.

**Orchard fertilization—ground and foliage.**  
*Bett. Crops*, 1951, **35**: 7: 6-12, illus.

g MAY, E. B.

**Pruning to control growth peculiarities of some apples.**  
*N.Z.J. Agric.*, 1951, **83**: 32, illus.

h DE MIGOYA, A. E. de E.

Levaduras aisladas de ciruelas maduras. (Yeasts isolated from ripe plums.)  
*Rev. Invest. agric. B. Aires*, 1950, **4**: 277-95, bibl. 31.

i MINISTRY OF AGRICULTURE, LONDON.

**Acarine disease of bees. Description and treatment.**  
*Adv. Leafl. Minist. Agric. Lond.* **330**, 1951, pp. 7.

j MINISTRY OF AGRICULTURE, LONDON.

**Migratory beekeeping.**  
*Adv. Leafl. Minist. Agric. Lond.* **344**, 1951, pp. 4.

k NORBURY, C. P.

**Future trends in apple and pear production.**  
*Agriculture, Lond.*, 1951, **58**: 14-18.

l PALMER, E. F.

**Fruit varieties [for Ontario].**  
*Bull. Ont. Dep. Agric.* **430**, revised 1951, pp. 51.  
For earlier editions see *H.A.*, **13**: 726 and 17: 42.

m POTTER, J. M. S.

**Fruit from the garden.**  
*Growmore Bull. Minist. Agric. Lond.* **7**, 1949, pp. 13 [received 1951].

n REIZENSTEIN, H. H., and BITTING, H. W.

**Farm-to-retail margins from Appalachian apples marketed in Pittsburgh, 1949-50 season.**  
*Agric. Inf. Bull. U.S. Dep. Agric.* **44**, 1951, pp. 26.  
Shows where the costs are incurred.

o REMY, P.

L'étude de la période juvénile chez les arbres fruitiers (Bibliographie). (The study of the juvenile stage in fruit trees: a review of the literature.)  
*Rev. hort. Paris*, 1951, **123**: 543-7, bibl. 14, illus. [See also *H.A.*, **21**: 3274.]

p STUART, G. M.

**Varieties of apples, pears and plums.**  
Reprinted from *Roy. Caled. hort. Soc. J.* No. 5, 1951, as *Misc. Publ. Edinb. Coll. Agric.* **82**, pp. 6.  
Suitable for soil and climate of S.E. Scotland.

q UPSHALL, W. H.

**Orchard grafting.**  
*Bull. Ont. Dep. Agric.* **439**, revised 1949, pp. 23, bibl. 3, illus. [received 1951].  
A very slightly amended version of the 1944 edition. [See *H.A.*, **14**: 1051.]

r WEST, C., HULME, A. C., and MANN, G.

**Fruit drying in hop kilns.**  
*Interim Record Ditton Lab. D.S.I.R.* **18**, 1951, pp. 10 [mimeo. not for publication].



## SMALL FRUITS, VINES AND NUTS.

*Small fruits.*

(See also 7, 250a, b, c, e, g, 468, 1050.]

204. MINISTRY OF AGRICULTURE, LONDON.

**Bush fruits.***Bull. Minist. Agric. Lond.* 4, 1951, pp. 37, bibl. 12, illus., 2s. 0d.

hitherto the bush and cane fruits have been dealt with by the Ministry of Agriculture in one bulletin (*Bull.* 4), with the result that in the fifth edition, 1942, bush fruits were somewhat summarily treated in sixteen pages. This new bulletin covers only black currants, red currants and gooseberries, and gives full, up-to-date information on acreages, certification, varieties, sites, cultivation, marketing and pest and disease control. Most of the twenty-nine photographic plates illustrate propagation and pruning methods. It is interesting to note that although the acreage under black currants has increased from 8,400 acres in 1945 to 15,200 acres in 1949, and the yield per acre has increased considerably in recent years as a result of the use of disease-free planting material, the demands of the home market are still unsatisfied.

205. BAKER, R. E., and BUTTERFIELD, H. M.  
Commercial bushberry growing in California.  
*Circ. Calif. agric. Ext. Serv.* 169, 1951,  
pp. 55, bibl. 11, illus.

The economic and agricultural factors involved in commercial bush fruit production in California are discussed and advice is given on all aspects of culture. The most important bush fruit is the trailing blackberry, including the boysen, nectar, young and loganberry; erect blackberries are mainly grown for processing; raspberries do not do well; currants do not sell readily on the fresh market and require irrigation; gooseberries are of minor importance and only one variety, Oregon Champion, is grown commercially; blueberry production is limited to a few plantings near Santa Cruz, Sebastopol and Eureka.

206. KUZJMIN, A. Ja.  
The suppression of hereditary characters by hybridization between distantly related plants.  
[Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951,  
16: 6: 18-21.

The results are given of pollinating red currant by gooseberry, black currant and *Ribes odoratum*, and raspberry by blackberry. The tendency was to exclude maternal characters from the progeny, and retain the paternal ones.

207. KONOVALOV, I. N.  
The morphology of berry fruits. [Russian.]  
*Bot. Zhurnal*, 1950, 35: 367-73, bibl. 20,  
illus.

A comparison of forms of berry fruits, with illustrations of transverse and longitudinal sections of the fruits of black currant (*Ribes nigrum*), cucumber (*Cucumis sativus*) and grapevine (*Vitis vinifera*).

208. SLATE, G. L., and KLEIN, L. G.  
Blackberry breeding.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 158-62.

An account is given of breeding work carried out in New York since 1929. The aim has been to breed blackberry varieties giving reliable production, perfect berries and a habit of growth facilitating harvesting. There has been a high mortality of seedlings after transplanting. Eldorado has been the chief parent used. This variety is resistant to orange rust and gives good berries. The characteristics of selections used as parents are given and some of the selections are discussed. In later work Bailey proved the best parent. C.W.S.H.

209. JOHANSSON, E.  
Sortförsök med svarta vinbär. (Variety trials with blackcurrants.) [English summary 1½ pp.]  
*Medd. Trädgårdsförs. Malmö*, 64, 1951, pp. 26, bibl. 9, illus.

Results of trials conducted throughout Sweden have shown that the Wellington black currant varieties, especially Wellington XXX and Silvergieter, are most suitable for southern Sweden, Wellington X and Brödtorp for the central parts, and Brödtorp for the north.

210. KATRANOVA, G. V.  
Quicker raising of black currants. [Russian.]  
*Sad i Ogorod*, 1951, No. 7, pp. 19-22, illus.

In the autumn 20-25 cm. long, hardwood cuttings were placed in sand at an angle of 45°, in uncovered frames. Early the following spring the frames were covered up; the sand watered and the temperature kept at 10-12° C. to encourage root formation but not breaking of buds. Cuttings thus treated were ready for planting out in 25-30 days. Softwood cuttings were taken three times during the summer and set in frames where they rooted in 20-24 days, with 90-98% success. The usual method of propagating new varieties of black currants by seed was found satisfactory, but red currants gave better results when the whole fruit was planted immediately after harvest.

211. MINISTRY OF AGRICULTURE, LONDON.  
Register of growers [in the U.K.] of certified black currant bushes, 1951, (Mimeo.), pp. 47.

Certificates relate solely to purity of stocks and their apparent freedom from "reversion" at time of inspection. [Similar yearly registers are drawn up of growers of raspberries, strawberries, narcissi, hops and potatoes.]

212. LICCIARDELLO, J. J., ESSELEN, W. B., Jr., AND FELLERS, C. R.  
Stability of ascorbic acid in fresh cranberries during storage.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 94, bibl. 3.

Cranberries are a good source of vitamin C, but this trial showed that 6 varieties lost 60-75% of their ascorbic acid in 6 months cool storage. C.W.S.H.

213. SLATE, G. L., AND KLEIN, L. G.  
Some results from the breeding of red raspberries.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 155-7.

Selections made at Geneva, N. York, from crosses carried out in 1945 indicate that the varieties St. Walfried and Lloyd George of the European red raspberry, *Rubus idaeus*, are outstanding parents and should be used for crossing with suitable clones of American varieties. The crossing of Herbert with Newman has been a failure. C.W.S.H.

214. STRONG, W. J.

The strawberry in Ontario.

Bull. Ont. Dep. Agric. 458, revised 1951, pp. 35, illus.

The information contained in the 1948 edition [see H.A., 18: 2501] has been brought up to date. A new system of growing everbearing strawberries under a sawdust mulch is described.

215. HYAMS, E.

A six-month strawberry season?

Country Life, Lond., 1951, 110: 1374-5, illus.

The author gives his experience in southern England in 1951 with 5 perpetual fruiting strawberry varieties from France, Charles Simmen, St. Claude, Général de Gaulle, Sans Rivale and Triomphe, grown under like conditions to those provided for Royal Sovereign E.M. 40/48. Observation in this one season leads the author to conclude that of them Charles Simmen has the best flavour and largest fruit, while St. Claude is the variety for those who like fruit to be of good appearance and flavour but are indifferent as to size. Although no definite virus symptoms were found among the plants by the experts, they cannot yet be pronounced free from virus. He concludes that if one were planting strawberries for successional crops from May to October a good choice would be: Charles Simmen cloched in February, Royal Sovereign E.M. 40/48 cloched in February, Royal Sovereign E.M. 40/48 not cloched, St. Claude not cloched, and Sans Rivale, cropped August and September, then cloched in late September after heavy feeding with dried blood.

216. HITZ, C. W.

Utilization of chicken manure in the production of strawberries.

Proc. Amer. Soc. hort. Sci., 1951, 57: 37-44, bibl. 4.

Chicken manure, consisting of droppings with litter of sawdust and peanut hulls, gave somewhat erratic results when applied to strawberry beds in experiments carried out between 1943 and 1949 at Newark, Delaware. It was considered that differences in response to the manure were due to differences in soil and rainfall. It was, however, concluded that the manure is better applied in the previous autumn than just before planting in the spring or as a top dressing. The latter treatments increased plant mortality.

C.W.S.H.

217. MOŠKOV, B. S.

The effect of the composition of the radial energy of the spectrum on the growth of strawberry and bryophyllum. [Russian.] Doklady Akad. Nauk S.S.S.R., 1951, 76: 593-6, bibl. 4, illus.

In descending order of vigour of growth (as estimated by the dry weight of the plants) the results obtained are given for the colour regions of the spectrum: yellow-green, blue-violet, and orange-red.

## Vines.

(See also 3, 250d, h, i, 1071, 1090.)

218. PIROVANO, A.

Production de nouvelles variétés de raisins de table. (Raising new varieties of table grapes.)

Progr. agric. vitic., 1951, 136: 249-53.

The author's experiments are mostly on conventional lines but his method of pollination is said to be better than the use of a brush. The pollen is placed in a small tube attached to a rubber bulb, the tube inserted in the paper bag protecting the inflorescence, and the bulb squeezed; this creates a cloud of pollen in the bag and the flowers are successfully pollinated. He goes on to describe his successes in producing varieties (1) with large berries, (2) of special flavour, (3) with new colouring, (4) seedless.

219. EINSET, J., AND LAMB, B.

Chimeral sports of grapes.

J. Hered., 1951, 42: 159-62, bibl. 10, illus., being J. Pap. N. Y. St. agric. Exp. Stat. 861.

On the basis of chromosome counts of the root tip and observations on breeding behaviour the Eaton grape has hitherto been considered a tetraploid variety. A study of sections of rapidly growing buds, however, has shown that the variety is a periclinal chimera with diploid epidermal cells over tetraploid internal tissue. Preliminary studies of several other large-berried sports, mostly of the Concord and Fredonia varieties, have shown that in each case the epidermal layer is diploid.

220. ROŽANEC, G. M.

A wild vine (*Vitis silvestris* Gmel.) in the valley of the river Proot. [Russian.] Bot. Zhurnal, 1950, 35: 294-6, bibl. 5.

After a short history of the occurrence of *Vitis silvestris* in the south-west of European Russia and in Rumania a detailed description of its characters is given. It is suggested that it might be a valuable vine for breeding experiments because of its resistance to mildew [*Plasmopara viticola*] and to frost.

221. GALET, P.

Méthode de description et de classification des espèces, variétés et hybrides de vignes. (A method of describing and classifying vine species, varieties, and hybrids.)

Progr. agric. vitic., 1951, 136: 221-9.

The author discusses the ampelometric bases for the description and classification of vines (villosity of the organs, ampelometric measurements, types of leaves and their lobing), and gives a key for the recognition of *Vitis* spp. in cultivation.

222. SOLDATOV, P., HAĬDARKULOV, G., AND SMIRNOV, K.

The raisins and currants of the Samarkand province. [Russian.]

Vinodelie i Vinogradarstvo, 1951, No. 9, pp. 41-3, illus.

This is an account of the cultivation of stoneless grapes (for currants and raisins) and their distribution in Samarkand. Varieties grown are tabulated to show size and weight of bunches, weight of 100 berries, and the sugar and acid content.



223. KONDO, I. N., AND ALEHIN, K. K.  
A trial of kiljčevanie methods of treating vine cuttings. [Russian.]  
*Vinodelie i Vinogradarstvo*, 1951, No. 9, pp. 32-5, illus.  
The value of "kiljčevanie" methods of exposing vine cuttings to cold [H.A., 20: 636] is emphasized with experimental data, especially when used with ice or snow for cooling and the sun's rays for heating.
224. BRANAS, J.  
Greffages à oeil dormant (Mayorquaine, Cadillac, etc. . . .). (Grafting dormant buds by the Mayorquaine and Cadillac methods.)  
*Progr. agric. vitic.*, 1951, 136: 109-13.  
The methods of grafting described for vine buds are carried out at the end of summer—towards the end of August or early in September, when the vines make a second growth. The rootstock is rooted *in situ* several months previously, and the scion is taken from a shoot that is becoming lignified. The rootstock should not be cut back but it may be trimmed. Two methods are mentioned, the Mayorquaine and the Cadillac. The former is said to be difficult to do by hand, but it can be done mechanically. The oblique cut of the Cadillac type is easier. The graft should be tightly wrapped and earthed up. Union occurs in the autumn, but the bud remains dormant until spring.
225. MIŠURENKO, A. G., AND PRESLER, R. I.  
The effect of temperature on the rooting of the rootstock in raising grafted vine seedlings. [Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 9: 24-31, bibl. 3, illus.  
The best temperature during the stratification of the grafted plants is considered to be one in which the union of scion and rootstock is kept at 24-26° and the basal portion of the rootstock at 14-16° C.
226. MALTABAR, L. M.  
Raising vine stocks by Mičurin's methods. [Russian.]  
*Vinodelie i Vinogradarstvo*, 1951, No. 7, pp. 36-40, bibl. 1, illus.  
Expanding vine growing in Moldavia makes great demands on planting material both grafted and self-rooted. After a discussion on methods of pruning, a system to obtain "vase-shaped short-branched" bushes is described and illustrated, which ensures maximum shoot production for propagation purposes, without reducing the yield. When fully grown the stock has 6 spur heads and the main branches develop from buds of 1-year-old wood, which in turn are again pruned. The varieties Riparia × Berlandieri Kober 5-BB and Riparia × Rupestris 101-14 are stated to react particularly well to this treatment.
227. PEYER, E.  
Der Verbrauch von amerikanischem Unterlagenholz für die Rebveredlung in der Ostschweiz. (The demand for American rootstocks for vine grafting in Eastern Switzerland.)  
*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 419-23, illus.  
Data for the past 30 years show an increasing demand for rootstocks. Great strides have been made in replanting vineyards with grafted varieties since the end of the war. The quantity of wood used for rootstocks supplied by the Wädenswil Research Station, in metres, in 1920-30 was 1,524,200 as compared with 3,009,860 in 1940-50. A progressive general reduction in the number of varieties used for rootstocks has taken place, and the proportion of Riparia varieties was reduced from 89.9% of the total supplied in 1920-30 to 55.8% in 1940-50, the rest in both cases being made up by Berlandieri types.
228. TROFIMOVA, A. I.  
Data on the phenology of the grapevine. [Russian.]  
*Vinodelie i Vinogradarstvo*, 1951, No. 8, pp. 87-8.  
Data are tabulated showing (1) the day on which temperatures began to be over 10° C., (2) the date when fruit picking started, (3) the sum of the temperatures above 10° C. up to the start of fruit harvest for 8 varieties in a number of vinegrowing regions in the U.S.S.R.
229. ZILLIG, H., AND HEYMER, T.  
Ermittlung von Fruchtansatz und Holzreife bei Weinreben. (Estimation of fruit set and of wood maturity in vines.)  
Reprinted from *Weinb. wissenschaftl. Beihfte*, 1950, 4: 97-105, bibl. 1, illus.  
The number and development of inflorescences in grape vines can be estimated during the winter by a simple method of dissecting forced buds. In assessing wood maturity the formation of the periderm and of the secondary bark, and the starch content are considered to be the most reliable characteristics.
230. THERON, C. J.  
Winter pruning and trellising of vines.  
*Bull. Dep. Agric. S. Afr.* 249 (*Stellenbosch-Elsenburg Fmrs' Ser.* 168), 1948, pp. 25, bibl. 2, illus., 3d. [received 1951].  
In the first part of this bulletin the principles of vine pruning are discussed and a description is given of the methods of pruning most commonly practised in South Africa for untrellised vines, vines trained along posts and vines trellised on wire. In the second part, the principles and practice of trellising are dealt with for wine and table grapes separately. Four systems are described for trellising table grapes, i.e. the Perold, the fish-spine, the overhead trellis and the slanting trellis. Recommendations are made on trellising materials.
231. MÜLLNER, L.  
Einfluss der Rebenerziehung auf Ertrag und Qualität. (The influence of training on yield and quality in vines.) [English summary 4 lines.]  
*Mitt. Klosterneuburg*, 1951, 3: 105-8.  
A lively controversy arose among Austrian viticulturists when a grower broke away from the ancient tradition of staking vines and advocated instead the horizontal cordon trained on a trellis 1.20-1.30 m. above the ground with planting distances of 1.20 m. within the row and 3.50 m. between the rows, to allow for mechanized cultivation. In order to test the new suggestion the horticultural research station laid down four trials in which the vines were trained as

horizontal cordons. The results obtained during the first three years show that the method is not detrimental to quality provided that severe pruning is avoided and yields are thus kept within the limits of staked vines. The greater distance of the grapes from the ground did not affect maturity as had been postulated; on the contrary, the berries suffered less from rots and could be picked later than the controls. Acid content was slightly higher in grapes from cordons, but so was the sugar content. The experiment is being continued.

232. PRONIN, F. M.

The use of the two-branched form of vine plant. [Russian.]

*Sad i Ogorod*, 1951, No. 8, pp. 39-41.

Trials of vines with single stems and two-, four-, six-, and seven-branched forms showed the superiority of the two-branched system, which is thus recommended for regions with insufficient moisture, e.g. the dry zone of south-east U.S.S.R.

233. ALEHIN, K. K.

A new supporting system for vineyards of Central Asia. [Russian.]

*Vinodelie i Vinogradarstvo*, 1951, No. 9, pp. 38-41, illus.

Climatic and soil conditions in many regions of Central Asia are very suitable for viticulture, but full use is not made of these advantages because the best form of vine-support is not used. The vertical espalier is most general but the author recommends a double espalier support of wood or iron, which is here described with dimensions, and gives figures to show the higher yields obtained by this method.

234. ANSTETT, A.

L'influence de l'apport azote dans l'humification des sarments de vigne. (The effect of applications of nitrogen compounds in composting vine twigs.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 240-4.

The effect of adding ammonium nitrate in different amounts and at different times to chopped-up vine twigs is recorded. The conclusion drawn is that with very woody material destined for compost, such as vine twigs, the application of large amounts of N is not justified either scientifically or economically.

235. ZILLIG, H., AND WIEMER, E.

Maschinenarbeit in der Rebschule.

(Machines for the vineyard.)

Reprinted from *Rheingauer Weinztg*, 1951, 37: 65-7, illus.

An illustrated description is given of some new machinery for soil preparation for planting, cultivation, spraying, and lifting and replanting of vines.

236. DUPAIGNE, D.

Mésure de la résistance à l'arrachement des grains de raisin. (The resistance of grapes to removal from the stalks.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 287-9, bibl. 3.

The resistance of grapes to removal from their stalks was determined by means of a small dynamometer. The decreasing resistance in relation to maturity and sugar/acid ratio is shown.

237. DURMIŠIDZE, S. V.

1-galocatechin in the composition of grapevine tannin. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 859-62, bibl. 5, illus.

The amount of galocatechins varies during the growth period of the grapevine. Data tabulated for three varieties show that the amount present in the seeds in September is about double that in July.

238. ANDRÉ, —, AND OTHERS.

Contribution à l'étude de la maturation du raisin. (The ripening of grapes.)

*Progr. agric. vitic.*, 1951, 136: 99-103, 115-26, 141-52.

This is a general account of the factors underlying a study of the ripening of grapes—the biology of maturation, the maturation index, sampling, and conclusions to be drawn.

Nuts.

(See also 250f.)

239. MORT, C. H.

Almond variety and stock trials.

*Agric. Gaz. N.S.W.*, 1951, 62: 247-50, 262-4, illus.

Results from the trials to date indicate that yields obtainable from Hatch's Nonpareil and Chellaston compare favourably with those from other varieties. As these two varieties produce nuts of the highest quality, they appear to be entirely satisfactory for main plantings. Of the varieties suitable for pollinating Hatch's, Strout has produced the best yields. Early Jordan, Brande's Jordan or Riverside Peerless should prove satisfactory for planting with Chellaston. Under the conditions of the experiment, almond stock has proved to be more satisfactory than peach stock. Medics (burr or barrel clover) are suitable for green manures under conditions similar to those at Wagga. Annual pruning has been considered necessary. Control measures are necessary for shot-hole fungus and mite. [Author's summary.]

240. THOMAS, P. H.

Hazel nut culture.

*Tasm. J. Agric.*, 1951, 22: 248-50.

In Tasmania filberts and cob-nuts thrive in the partially shaded gullies found in the principal berry growing districts, and, with the present demand for this type of nut, their cultivation should prove a good investment. They may be propagated by cuttings and layers, or grafted on a common stock by methods similar to those used for raising fruit trees.

241. AMELINCKX, F.

Het geslacht *Corylus* L. (The genus *Corylus* L.)

*Cult. Hand.*, 1951, 17: 42-4.

An account of varieties of hazel nut cultivated in the Netherlands, with their local names.

242. JOHANSSON, E.

Sortförsök med hassel vid Alnarp 1938-1950. (Hazel nut variety trials at Alnarp 1938-1950.) [English summary 1 p.]

*Medd. Trädgårdsförs. Malmö* 63, 1951, pp. 11, bibl. 5, illus.



comparative trials were conducted with 11 varieties, as a result of which Tidig lång Zeller (Early Long Filbert), Cosford, Lambert Filbert and Bergeri are recommended for cultivation in Sweden.

243. SHARPE, R. H., AND WINSOR, H. W.

Cross-feeding and boron placement studies with pecans.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 203-6, bibl. 9.

An experiment in which boron (Colemanite) applications were made in rings round pecan trees indicated that no border trees are necessary in fertilizer experiments under Florida conditions. Untreated trees adjacent to treated ones showed no increase in the boron content of their leaves. Among treated trees the highest leaf boron content was found in those trees for which applications were made in the middle branch-spread, 7-14 ft. from the trunk. C.W.S.H.

244. BRYNER, W.

Walnussveredlung. (Walnut grafting.)

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 411-18, illus.

Indoor grafting is more suitable for Swiss conditions than grafting in the field. The method used is based on professor Kemmer's system [see *H.A.*, 7: 314 and 721], but instead of bedding the grafted plants closely together, potting prior to grafting is considered more satisfactory. Two-year-old *Juglans regia* and *J. nigra* seedlings are used for rootstocks, the operation being carried out between the end of March and the beginning of May. The technique of outdoor grafting and reasons for lack of success are outlined. Notes are given on the characters of the 3 most popular varieties propagated: Franquette, Mayette and Parienne.

245. GLENN, E. M.

Grafting walnuts, some methods used in France.

*Fruit Year Book 1951-2*, 1951, pp. 91-3, illus.

Some methods of grafting practised in the famous walnut growing district of Grenoble are described. A common practice is to plant a seedling or sow a seed in its permanent position and high-work it at a height of 5-6 ft. with a scion of the required variety by a simple wedge graft. *Juglans nigra* is generally used as rootstock, as it is considered more resistant to *Armillaria mellea* than *J. regia*. Root grafting is also used, and the technique is simpler and the results are better than in England.

246. HANSEN, C. J., AND HARTMANN, H. T.

Influence of various treatments given to walnut grafts on the percentage of scions growing.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 193-7, bibl. 3, illus.

A rather high proportion of failures has been common in bark grafting *Juglans regia* onto California black walnut (*Juglans hindsii*) stocks. The tests described showed that covering the scions with moist peat moss, or whitewashing scion and stock, increased the "take". Covering the grafts with paper bags was effective in one year only, while dipping scions in growth regulating

chemicals had no effect. The modified bark graft method used is described. C.W.S.H.

247. SERR, E. F., AND FORDE, H. I.

Comparison of size and performance of mature Persian walnut trees on Paradox hybrid and *J. hindsii* seedling rootstocks.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 198-202, bibl. 5.

Paradox hybrid (*Juglans hindsii* × *J. regia*) rootstocks are more resistant to the root-lesion nematode, *Pratylenchus vulnus*, and probably more resistant to crown rot, *Phytophthora cactorum*, than are *J. hindsii* rootstocks. Records from orchards containing both these rootstocks have indicated that, on California hill land, trees on Paradox rootstocks are thicker and higher yielding, while in deep valley soils tree size and yield are similar but the nut size and kernel colour of nuts from trees on Paradox stocks are better than from trees on *J. hindsii* stocks. C.W.S.H.

248. ŠČEPOTJEV, F. L.

Abnormal fruits of walnut (*Juglans regia* L.). [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 1103-5.

Walnuts with one, three and four suture lines instead of the normal two, are described and figured; pistillate flowers with one, two, three, and four stigmas are shown.

249. TYRRELL, D. P., JENKINS, M. H., AND WEIS, A. E.

The nutritive value of black walnuts.

*Res. Bull. Mo. agric. Exp. Stat.* 476, 1951, pp. 12, bibl. 27.

Analyses show the black walnut to be a fair source of B vitamins. Its present value lies in its use as an accessory food to enhance flavour.

### Noted.

250.

a BOUYOUCOS, G. J., AND MARSHALL, R. E.  
A pressure tester for small fruits and fruit and vegetable tissues.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 211-13, bibl. 3, illus.

b BROWN, J. F., GOBLE, H. W., AND MAC-LACHLAN, J. D.

Raspberry and blackberry culture [in Ontario].

*Bull. Ont. Dep. Agric.* 473, 1950, pp. 41, illus.

Replaces *Bull.* 355 [see *H.A.*, 15: 1008].

c CHANDLER, F. B.

Effect of methods of irrigating cranberry bogs on water table and soil moisture tension.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 65-72, bibl. 8.

d GABRIEL, F.

ABC du tailleur de vigne. (An ABC of vine pruning.)

*Bull. Insp. gén. Dir. Agric. Algér.* 154, 1950, pp. 42, illus.

- e JORDAN, C., NAUJOKS, E., AND V. SENG-BUSCH, R.  
Einige Erdbeer-Neuzüchtungen. (Some new strawberry varieties.)  
Reprinted from *Gartenwelt*, 1950, Nos. 3 and 5, pp. 3.  
Suitable for dessert, freezing and canning.
- f LEROY, J. F.  
Le pecanier (*Carya illinoensis* Wang. K. Koch): morpho-biologie florale. Fructification. (The pecan: floral morpho-biology. Fruiting.)  
*Fruits*, 1951, 6: 1: 6-14, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 182.
- g MILLS, P. A.  
Report on galacturonic acid in strawberry juice.  
*J. Ass. off. agric. Chem. Wash.*, 1951, 34: 513-20, illus.
- h TUKOVIĆ, Z.  
Kroatishe Sortenfragen. (Croatian vine varieties.)  
*Mitt. Klosterneuburg*, 1951, 1: 147-51.
- i WELLINGTON, R.  
French hybrid grapes [at New York agric. Exp. Stat.].  
*Amer. Fruit Gr.*, 1951, 71: 10: 10-11, 18, illus.

## PLANT PROTECTION OF DECIDUOUS FRUITS.

## General.

(See also 1080.)

251. HORSFALL, J. G., AND DIMOND, A. E.  
Plant chemotherapy.

*Annu. Rev. Microbiol.*, 1951, 5: 209-22, bibl. 98.

The subject is reviewed under the headings: Concepts in plant chemotherapy; Topical chemotherapy of local diseases; Systemic chemotherapy of local diseases; Systemic chemotherapy of systemic diseases; Effect of the therapeutant on the pathogen; Effect of the therapeutant on the fungus toxin; Effect of the therapeutant on the host; Direct assay of therapeutants on the host.

252. REINMUTH, E.  
Die zeitgebundene Beeinflussung der Pathogenese von Pflanzenkrankheiten. (The time factor in the development of plant diseases.)  
*NachrBl. dtsh. PflSchDienst, Berlin*, 1951, 5: 1-8, bibl. 32.

Many plant diseases are either seasonal or prevalent at a certain developmental phase of the host, for instance the seedling stage. Some pathogens or pests attack only young organs of older plants, among them *Pythium palmivorum* which infects the leaves of cocoa palms before they are unfolded, and the midge *Contarinia nasturtii* infesting the "heart" of brassicas. Mildew of cucumber and peas and pea rust are quoted as examples of diseases the incidence of which has a seasonal character. In many cases the active phase of pests, e.g. that of the potato nematode, *Heterodera rostochiensis*, is determined by the season. The correlation between meteorological conditions and fungal and bacterial development (e.g. *Phytophthora infestans* and *Bacterium tabacum*) has been elucidated by Bortels' studies. The extent to which liming achieves clubroot control is partly dependent on the time of application, as was shown by the author. The time factor also enters into the problem of seedling susceptibility to diseases and pests. Rapid development will help the plant to "grow away" from *Rhizoctonia*, *Pythium*, *Phoma* and *Aphanomyces* diseases as well as from flea beetle, wireworm and maggot attacks. In pome fruit resistance to the spread of fruit rots within the tissues decreases with

maturity in contrast to increasing resistance to infection in the outer layers and in the cuticle in particular. A similar change occurs in peach leaves in relation to infection by *Taphrina deformans*. The interesting review, from which only a few points have been mentioned, concludes with a discussion of pre-immunity to fungus, bacterial and virus diseases in plants.

253. WHITE, P. R.  
Neoplastic growth in plants.  
*Quart. Rev. Biol.*, 1951, 26: 1: 1-16, bibl. 132.

In this review of work on abnormal growth in plants are discussed physical, chemical, virus, bacteriological, mycological and phanerogamic galls, and neoplasms of animal origin (caused by nematodes and insects).

254. VERONA, O.  
Sulla natura di alcuni danni prodotti nelle piante da cause avverse. (The nature of the damage caused to plants by hostile agents.)  
*Humus*, 1951, 7: 10: 9-12.

The author notes that generally speaking in the past it has been the quantity rather than the quality of damage done to plants which has received attention. He instances among other types of qualitative damage the considerable loss in essential oils sustained by medicinal plants, e.g. by *Mentha piperita* attacked by *Phyllosticta menthae*, by *Salvia officinalis* attacked by *Septoria salviae*, by *Aconitum napellus* attacked by *Urocystis colchici*. Again oil analysis in healthy olive and in olives subject to attack by *Macrophoma dalmatica* shows important differences. He considers that such qualitative effects of pests or diseases deserve much more attention than they have hitherto received and that their investigation is of great economic importance.

255. BARDÍA, R. B.  
Enfermedades de los árboles frutales en el Ampurdán y sus tratamientos. (Pests and diseases of fruit trees in Ampurdán and their control.)  
*Publ. Obra Social agric. 16*, 1950, pp. 68, illus.

The pamphlet gives growers an up-to-date summary illustrated by photographs and diagrams, of the biology and control of the most serious pests and diseases of fruit trees in Ampurdán, Spanish Pyrenees.



These are apple blossom weevil, codling moth, Mediterranean fruit fly, mealy plum aphid (*Hyalopterus ruginervis*), cherry black fly (*Myzus cerasi*), green apple aphid (*Aphis pomi*), woolly aphid, various scale insects of deciduous fruit trees, olives and citrus, apple and pear scab, peach leaf curl, and root rots caused by *Rosellina necatrix* and *Armillaria mellea*.

# 256. VAUGHAN, E. K., AND OTHERS.

## Diseases observed on bramble fruits in the Pacific North-west.

*Plant Dis. Repr.*, 1951, **35**: 34-7, illus.

The diseases mentioned, with brief descriptions are:—*Virus diseases*: mosaic, leaf curl, dwarf. *Other diseases apparently of virus nature*: ring spot, purple stunt, yellows. *Fungus diseases*: anthracnose (*Elsinoe veneta*), leaf and cane spot (*Septoria rubi*), yellow rust (*Phragmidium rubi-idaei*), cane and leaf rust (*Kuehneola uredinis*), powdery mildew (*Sphaerotheca humuli*), cane gall (*Agrobacterium rubi*), crown gall (*Agrobacterium tumefaciens*). *Diseases of unknown origin*: calico, crumble berry, dead arm, leaf scorch. *Abnormalities probably caused by unseasonably cold weather*: lateral bud development on new canes, proliferation of fruit spurs, stippling alongside the veins, deeply serrated leaves ("fern leaf").—Oregon Agricultural Experiment Station.

# 257. WILHELM, S., THOMAS, H. E., AND KOCH, E. C.

## Diseases of the loganberry.

*Calif. Agric.*, 1951, **5**: 1: 11, 14, illus.

Unlike the boysenberry and the youngberry, the loganberry does not suffer from powdery mildew and verticillium wilt. It is, however, affected by dwarf disease, calico mosaic, septoria leaf and cane spot and orange rust; it was the dwarf virus disease which was largely responsible for the decline of the loganberry in California. The new thornless form is, however, less severely affected by dwarf disease. Calico mosaic is not serious if irrigation water is supplied. The leaf and cane spot fungus, *Septoria rubi*, can be controlled by two spring sprayings of Dithane Z-78, or Parzate, at 2 lb. per 100 gallons water, or by bordeaux mixture 2-2-50. The orange rust, *Gymnoconia interstitialis*, cannot be controlled by spraying and affected plants must be destroyed. The loganberry also suffers from sun and windburn and lack of water at critical times in unirrigated areas.

C.W.S.H.

# 258. SMITH, C. F., AND CLAYTON, C. N.

## Peach spray information.

*Special Circ., N.C. agric. Exp. Stat.* **12**, 1951, pp. 11.

The chief pests and diseases of peach are described and two peach spray programmes are given, one being an "alternate programme to be used only by those who will observe all precautions concerning parathion".

# 259. MILLER, P. W.

## Nut diseases in Oregon in 1950.

*Plant Dis. Repr.*, 1951, **35**: 145.

Notes are given on the following diseases: on walnut: blight (*Xanthomonas juglandis*), mushroom root rot (*Armillaria mellea*), leaf scorch (non-parasitic), black-line (girdle) of grafted walnuts (non parasitic), and

crown rot (cause undetermined); on filbert: blight (*Xanthomonas corylina*), mildew (*Phyllactinia corylea*), brown-stain (non-parasitic).—Oregon State Coll.

## Disturbances of nutrition or of unknown origin.

(See also 75, 76, 77, 79.)

# 260. VERONA, O.

Le malattie da carenza nelle piante fruttifere.

(Deficiency diseases in fruit species.)

*Riv. Ortoflorofruttic. ital.*, 1951, **35**: 105-15, bibl. 47, illus.

A useful account of the phenomena of deficiency diseases in pome and stone fruits, their determination and possible elimination. Until recent times such problems had not worried the Italian fruitgrower or investigator very much and this article is based mainly on the observations of foreign workers.

# 261. HAGLER, T. B.

## Nutrient-element deficiency symptoms of dewberries in sand culture.

*Proc. Amer. Soc. hort. Sci.*, 1951, **57**: 59-63, bibl. 2, illus.

The symptoms produced by lack of nitrogen, phosphorus, potassium, magnesium, calcium and sulphur when dewberries were grown in sand cultures at Auburn, Alabama, are described. The weight of leaves, canes and roots produced was much decreased by lack of all those elements except sulphur.

C.W.S.H.

# 262. IWAKIRI, B., AND SCOTT, L. E.

## Mineral deficiency symptoms of the Temple strawberry grown in sand culture.

*Proc. Amer. Soc. hort. Sci.*, 1951, **57**: 45-52, bibl. 12.

Strawberry plants were grown in sand in clay pots and nutrient solutions were applied every other day at College Park, Md. The solutions were either complete or lacked potassium, calcium, magnesium, phosphorus, boron or manganese. Deficiency of the first three caused severe depression of growth. Calcium deficiency symptoms were marginal necrosis and interveinal chlorosis. Magnesium deficiency produced similar symptoms more slowly and these were accompanied by twisting and downward cupping of leaf margins followed by a reddish-brown coloration of the leaflet periphery. Potassium deficiency symptoms were marginal chlorosis followed by interveinal chlorosis and the appearance of a central red band. Addition of the elements deficient caused rapid recovery. Phosphorus, boron and manganese deficiency caused no symptoms, but growth was less when phosphorus or boron were omitted.

C.W.S.H.

# 263. PEYER, E.

## Mangelerscheinungen an den Reben. (Deficiency symptoms in vines.)

*Schweiz. Z. Obst- u. Weinb.*, 1951, **60**: 364-5, illus.

A note advising growers to inspect their vineyards for deficiency symptoms shortly before harvest, when they are the most pronounced. The most important ones are briefly described.

264. BLACKMON, G. H., AND SHARPE, R. H.  
Effects of boron on certain deciduous fruits and nuts.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 78.

"Colemanite, in amounts containing boron equivalent to 3 lb. borax, was applied in 1949 in zones 0 to 7, 7 to 14 and 14 to 21 ft. from the trunks of mature pecan trees planted 50 ft. apart. Leaf samples taken in August from treated trees contained 3 to 8 times more boron than those from the checks. With the treated trees, leaves from 7- and 14-ft. zones had significantly higher boron content than from the 21-ft. zone. Trees adjacent to those treated did not show an increase in boron content of the leaves over that found in the checks, indicating no cross-feeding. Application of borax and Colemanite to pineapple pears produced no effects on tree growth, fruit structure, or quality."

265. ASKEW, H. O., CHITTENDEN, E. T., AND MONK, R. J.

"Die-back" in raspberries—a boron deficiency ailment.

*J. hort. Sci.*, 1951, 26: 268-84, bibl. 10, illus.

A die-back disease of raspberries in the Nelson District of New Zealand, characterized by the failure of buds to develop on fruiting canes, is shown to be due to boron deficiency in the soil of affected gardens. Borax at the rate of  $\frac{1}{2}$  oz. per bush has proved a very satisfactory control. While established bushes appear to be fairly tolerant to borax, care in its use is necessary on newly established plants.—Cawthron Institute, Nelson, N.Z.

266. SULAKADZE, T. S.

Features associated with the entrance of water into the tissues of chlorotic plants and the effect of growth-promoting substances on this process. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 941-4.

Experiments were carried out with discs taken from lemon and vine leaves, and with heteroauxin and an extract of brewers' yeast as growth-promoting substances. It is concluded that, with the low osmotic condition of the cell sap, the increased absorption of water by chlorotic plants is a result of increased permeability of the protoplasm, together with other factors, including the accumulation of growth-promoting substances in the tissues of diseased plants.

267. SCARAMUZZI, G.

La chlorosi del pesco nella zona di Albenga saggiata col "teste di Roach" e similari. (The chlorosis of peach trees in Albenga tested with the "Roach injection method" and similar methods.) [English summary 9 $\frac{1}{2}$  lines.]

*Not. Mal. Pianta*, 1951, No. 15, pp. 56-65, bibl. 32.

Injection and leaf painting methods have been tried with solutions containing Mg, Fe, Mn, Zn, Cu, Ni, B, Mo and combinations of these. Good results were obtained with the iron salt solution, the first visible effect showing after 2-3 days, but only after 10 days did the leaves assume a normal green colour. Almost similar results were obtained with zinc. A synergic action of these two elements is suggested.

268. HILL, H., AND DAVIS, M. B.

Lime induced chlorosis in eastern Canada.

*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 46-8.

At Ottawa, a collection of *Prunus* spp. and several varieties of plums, growing on a poorly drained soil with a pH of 8.0 to 8.5, high in calcium carbonate, were found to be affected with lime induced chlorosis. Within a relatively small area there were trees entirely free of symptoms while others had symptoms ranging from slight to very severe. Soil examinations were unable to account for the difference in tree behaviour. The trees were on seedling rootstocks of different origin and, although it was impossible to arrive at any basis for selecting tolerant rootstocks or tolerant rootstock variety combinations, the possibility was indicated of approaching the problem from that angle. For control, direct injections were made with various iron salts, and iron salt in gelatin capsules and ferrous sulphate tablets were inserted in the limb or trunk of the trees with varying results. Chlorosis induced by manganese deficiency and boron deficiencies of various crops are also discussed.

269. GALET, P.

Le dosage du calcaire actif et l'appréciation du pouvoir chlorosant des sols. (The amount of active calcium and an evaluation of soil induced chlorosis.)

*Progr. agric. vitic.*, 1951, 136: 277-82.

American vines, used as phylloxera-resistant rootstocks, are very sensitive to lime in the soil and they often suffer from chlorosis on some of the calcareous French soils. Methods for determining the lime content of the soil are discussed and that adopted by the author is described. A table shows the total and the active lime content of a number of calcareous rocks, and another table indicates the sensitivity of certain varieties of vine to the active lime content of the soil.

270. MOSER, L.

Die Behandlung der Chlorose des Weinstockes. (Treatment of vine chlorosis.) [English and French summaries 5 lines.] *Mitt. Klosterneuburg*, 1951, 1: 139-43.

In trials conducted by the author in his own vineyards, chlorosis of vines, grown on a soil containing over 50% lime, was cured by applications of 40% potassium salt at the rate of 2,000 kg. per ha. in the first year, 1,600 kg. in the second and 1,000 kg. in the third. In many cases, however, K salt alone was ineffective and the addition of an equal amount of basic slag was found beneficial. In extreme cases boron deficiency had to be corrected before the chlorotic symptoms disappeared.

271. SCOTT, L. E., AND SCOTT, D. H.

Response of grape vines to soil and spray applications of magnesium sulfate.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 53-8, bibl. 6, illus.

Soil and spray applications of magnesium sulphate were made in two vineyards where chlorotic foliar patterns indicated magnesium deficiency. Results were inconclusive. C.W.S.H.



272. BOYNTON, D., KROCHMAL, A., AND KON-  
ECNY, J.  
Leaf and soil analyses for manganese in  
relation to interveinal leaf chlorosis in some  
sour cherry, peach and apple trees of  
New York.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57:  
1-8, bibl. 4, illus.

Investigations were carried out to determine whether interveinal chlorosis in certain orchards was due to manganese deficiency. In cherry and peach trees leaf analyses indicated, with only three exceptions, that manganese deficiency was the cause, and spraying with manganese sulphate removed the symptoms and greatly increased the manganese content of the leaves. There was no close association between symptoms and soil manganese. The relationship between soil pH and manganese availability is discussed. It is suggested that sulphur sprays may eventually reduce the available manganese content to deficiency levels. Traces of chlorosis in apple trees were considered to be due to manganese deficiency. Instances of chlorosis not associated with manganese deficiency were also noted.

C.W.S.H.

273. MULDER, D.  
Zinc deficiency of fruit trees in Europe.  
*Lotsya*, 1950, Vol. 3 (Trace Elements in  
Plant Physiology), pp. 85-6.

Mention is made of the few instances of zinc deficiency of apple trees that have been recorded in Europe, and the symptoms exhibited by Golden Delicious are described. Pears and cherries may also be affected. Little is known at present regarding soil conditions causing the trouble, but it occurs mostly on light sandy soils which have a rather high lime content. (See also *H.A.*, 21: 315.)

274. VITORIA, E., AND MOYANO, A. A. A.  
Informe sobre una enfermedad que afecta  
a los viñedos sanjuaninos en el departa-  
mento de Albardón. (Report on a disorder  
of vines in the Department of Albardón,  
Province of San Juan [Argentina].)  
*Experimenta*, 1951, 3: 7/9: 8-10.

A disorder of vines, characterized by an interveinal chlorosis of the young shoots accompanied in the advanced stages by necrosis, has become widespread in Albardón this year. The variety Moscatel appears to be most affected. Preliminary observations suggest that the disorder is caused by zinc deficiency.

275. WADLEIGH, C. H., HAYWARD, H. E., AND  
AYERS, A. D.  
First year growth of stone fruit trees on  
saline substrates.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57:  
31-6, bibl. 3.

Budded trees of peach, apricot, plum, prune and almond were planted in sand cultures in tanks and treated with sodium chloride, calcium chloride and sodium sulphate and with mixtures of the first two. Excess calcium chloride produced symptoms of severe chloride "burns".

C.W.S.H.

### *Climatic factors.*

(See also 97r, s, 109, 140, 143, 173, 256, 417a, m, x, 853, 883-8, 1070.)

276. MORRIS, H. E., AND AFANASIEV, M. M.  
Winter injury to sweet cherries in Montana.  
*Plant Dis. Repr.*, 1951, 35: 192-3.

Types of injury described were longitudinal splits in the bark and wood of the trunk and scaffold limbs, sunscald, and flower bud injuries. The flower bud injury resulted in the death of many buds, and many of the blossoms which opened were sterile.—Montana State College Agricultural Experiment Station.

277. DERKUNSKAJA, M. D.  
A trial for the early re-establishment of  
grapevines. [Russian.]  
*Vinodelie i Vinogradarstvo*, 1951, No. 7,  
pp. 12-13, illus.

When all the above-ground parts of espaliers, variety Riesling, were killed by frost, 4 primary shoots arising from buds at ground level were pinched back to 5-7 cm. to allow secondary branches to form a secondary tier of shoots. The re-establishment of the required shape was completed within one season; a very light crop was harvested and the wood was fully ripe before the bushes were covered up for the winter.

278. WANKE, K. G.  
Frostschutz durch Beregnung. (Frost  
protection through spraying.) (English and  
French summaries 6 lines.)  
*Mitt. Klosterneuburg*, 1951, 1: 155-9.

A general discussion on the principles of frost protection by spraying is followed by a brief description of a very efficacious spraying apparatus produced in Austria. The equipment, installed primarily for the frost protection of a 1 ha. apricot plantation, is also used for irrigation and pest control.

279. FRITH, H. J.  
Frost protection in orchards using air from  
the temperature inversion layer.  
*Aust. J. agric. Sci.*, 1951, 2: 24-42, bibl. 12,  
illus.

Experiments are described in which a 21-ft. diameter, vertical axis wind machine was used in citrus and almond orchards. The rise in temperature at the centre of the fan's influence was commonly 5-6° F., but depended on the strength of the temperature inversion, i.e. the difference between air temperature at 5 and 100 ft. A temperature rise of 25% of that under the fan extended to 2-3 acres in almonds and 1-1½ acres in citrus, though this area was increased when the citrus trees were skirted, i.e. had the lower 2 feet of branches and foliage removed. Only a few minutes' operation were required before the full effect of the fan was recorded at its range extremity, but, with strong inversion temperatures, the temperature would thereafter tend to fall slowly. The fan, in the form used, was not considered economic, since, in severe frost, the area protected was too small.—Griffith Irrigation Station.

C.W.S.H.

280. ANON.  
Schutz der Obstblüte vor Nachtfrosten.  
(Protection of fruit blossom from night frosts.)  
*Ratgeber Obstb. Sudhannover, Braunschweig*,  
1951, No. 5, p. 30.

A description is given of "Frost patrone Fumex", a cartridge which is filled with 2 kg. of Fumex, and is stated to develop 55,000-60,000 m<sup>3</sup> smoke in 15-18 min., which suffices for 5 ha. O.J.

281. PAUCK, —.

Spätfrostschäden im Obstbau. Möglichkeiten zur Abwehr. (Late frost damage in fruit growing and its prevention.)

Dtsch. Garten, 1951, 62: 5: 6.

Artificial mist produced by sulphur trioxide dripping on burned lime prevented late frost damage. One apparatus developed a fog strip of about 1 km. in width. O.J.

282. ANON.

Sofortmassnahmen gegen Spätfroste. (Immediate measures against late frosts.)

Unser Wegweiser, 1951, 6: 77.

For fruit plantations the use of artificial mist produced by hydrochloric acid plus ammonium hydroxide 1:1 is recommended. O.J.

283. BISTI, E. G.

The resistance of apple roots to overwatering. [Russian.]

Sad i Ogorod, 1951, No. 8, pp. 13-16, illus.

Observations were made on fruit trees, some artificially flooded in summer and others that were naturally flooded in spring. The effect on the trees is described—the yellowing and premature falling of leaves, the discoloration of the bark, fruit drop and injury to the roots. In one series of observations it was seen that the degree of resistance of pome fruit trees to flooding depended on the character of the flooding. When the water flowed freely, apple, pear and quince trees were able to stand flooding of their root systems for 1 to 1½ months, without taking into consideration the ordinary spring floods. With stagnant spring flooding the trees generally died.

284. SIAENS, F.

Bespoitingen om het barsten van kersen te voorkomen. (Spraying to prevent cherries cracking.)

Cult. Hand., 1951, 17: 393.

Spraying trials are described for reducing cracking and the subsequent infection by brown rot on ripening cherries in 1950. One application 3-4 weeks before picking the fruit was made with copper sulphate 0.01%, Cuprosyl 0.01 and 0.5%, and summer oil 1%. The best results were obtained with the Cuprosyl sprays.

285. SIAENS, F.

Est-il possible de prévenir le crevassement des cerises? (Can cracking in cherries be prevented?)

Fruit belge, 1951, 19: 105-6.

Spraying with copper preparations increased the number of cracked fruits, but Cuprosyl 0.01% resulted in fewer *Monilia* infections.

286. SOUTHERN RHODESIA, HORTICULTURAL BRANCH.

Experiments at Inyanga on delayed foliation.

Rhod. Fmr, 1951, 4: 18: 21, 24, illus.

In a preliminary trial in 1950 at Rhodes Inyanga

Orchards, at 6,000 ft. in S. Rhodesia, dormant spraying with a 5% DNOC oil spray had the following effects on apple varieties susceptible to delayed foliation: 1. Blossoming and foliation took place earlier. 2. Blossoming periods were shorter and more intense. 3. Dormant buds on 2-, 3- and 4-year-old wood were stimulated into growth. 4. Mildew control was satisfactory on sprayed trees. Notes are given on the behaviour of several varieties.

287. MINISTRY OF AGRICULTURE, LONDON.

Farm and estate hedges.

Fixed Equip. Fm Leaflet. Minist. Agric.

Lond. 11, 1951, pp. 14, illus., 1s.

A most useful account of how to remake an old neglected hedge, plant a new hedge and maintain it. The plants considered and classified as to soil and other environmental preferences are hawthorn (*Crataegus oxyacantha*), blackthorn or sloe (*Prunus spinosa*), crab apple, myrobalan, beech, hornbeam, maple, holly, willow [only in wet ground], gorse [on poor sandy soils].

288. MINISTRY OF AGRICULTURE, LONDON.

Shelter belts for farmland.

Fixed Equip. Fm Leaflet. Minist. Agric. Lond.

15, 1951, pp. 12, illus., 9d.

Types, purposes, effects, siting, choice of species, both conifers and hardwood, size of plant, time of planting, fencing and after management, and grants available in the U.K. are all considered in this leaflet.

289. BORELL, A. E.

Russian-olive—for wildlife and good land use.

Leaflet. U.S. Dep. Agric. 292, 1951, pp. 8, illus.

Russian olive, *Elaeagnus angustifolia*, thrives throughout the western parts of the United States, growing from sea level up to an elevation of 8,000 ft. It withstands temperatures ranging from 30° F. below zero to 115° F. above, and is ideal for windbreaks, low hedges or shade trees. Both wild birds and domestic poultry are known to feed on the fruit.

290. ARNOLD-FORSTER, W.

Wind-shelter and wind-tolerance.

J. roy. hort. Soc., 1951, 76: 341-7, illus.

Notes are given on some wind-hardy trees, shrubs suitable for wind-shelter, and wind-tolerant shrubs.

Viruses.

(See also 256, 257, 417b, y, 418c, d, 1072.)

291. KLINKOWSKI, M., AND BAUMANN, G.

Die Nomenklatur pflanzlicher Virose. (The nomenclature of plant virus diseases.)

NachrBl. dtsh. PflSchDienst, Berlin, 1951, 5: 121-8, bibl. 23.

International collaboration should pave the way for a uniform nomenclature of plant viruses based on natural relationships. The binomial system of Holmes as amended by McKinney would, in the authors' view, seem to be the most suitable basis.

292. BENNETT, C. W.

Interference phenomena between plant viruses.

Annu. Rev. Microbiol., 1951, 5: 295-308, bibl. 57.



A review of the subject, mention being made of cucumber and tobacco mosaic viruses, cacao swollen-shoot viruses and other virus diseases. The factors involved in interference are discussed.

293. THUNG, T. H., AND VAN DER WANT, J. P. H.

Viren en looistoffen. (Viruses and tannins.)

[English summary  $\frac{1}{2}$  p.]

*Tijdschr. PlZiekt.*, 1951, 57: 173-4.

Nicotine sulphate protected the rattle and mosaic tobacco viruses from precipitation by the tannins in asparagus leaves. Lead acetate precipitates the mosaic but not the rattle virus; this enables them to be separated *in vitro*.

294. COCHRAN, L. C.

The virus problem in nursery stock.

*Amer. Fruit Gr.*, 1951, 71: 10: 8-9, 19, illus.

A general discussion, with the most important virus diseases affecting stone fruits listed and many of the symptoms illustrated.

295. STOLL, K.

Ist eine Desinfektion von viruskranken Pflanzfreisern möglich? (Is disinfection of virus diseased scions possible?)

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 418-19, bibl. 2, illus.

Three methods of disinfecting virus diseased peach scions were tried at Wädenswil without success.

296. NATALJINA, O., PANJKOVA, O., AND ŠESTA-KOVA, A.

A rosette disease of apple trees. [Russian.]

*Sad i Ogorod*, 1951, No. 8, pp. 36-8, illus.

A disease of apple trees in gardens of the Saratov province (south-east Russia) is characterized by narrow, chlorotic leaves, thin branches mostly directed vertically, new growth arrested so that the shoots form "rosettes", and flowers small and deformed. Varieties showing the rosette disease are mentioned. The disease is considered to be caused by a virus, for healthy cuttings grafted onto affected trees became diseased.

297. PIVOVAROVA, R. M.

Teratological changes in flowers of black currant by doubling. [Russian.]

*Bot. Zhurnal*, 1950, 35: 595-601, bibl. 3, illus.

Virus infection of black currant causes teratological alterations in the flowers, the effect increasing from the base of the inflorescence towards the apex. The changes induced in the floral organs are described and illustrated.

298. AFANASIEV, M. M., AND MORRIS, H. E.

Virus diseases of sweet cherries in Montana in 1950.

*Plant Dis. Repr.*, 1951, 35: 191.

Surveys in Montana showed that mottle leaf, ring-spot complex, rasp and twisted leaf were present on sweet cherries in Montana. Another type of disorder, found in practically all varieties of cherry and with symptoms closely resembling those of virosis, was blotchy mottling.—Montana State College Agricultural Experiment Station.

299. CAIN, J. C., AND PARKER, K. G.

A preliminary report on the response of virus-infected Montmorency cherry trees to nitrogen fertilizer.

*Phytopathology*, 1951, 41: 661-4, bibl. 7.

Evidence is presented from one orchard growing in sod that the yellows virus disease of Montmorency cherries causes reduction in yield, largely through reduced fruit set and less spur formation. A comparison of trees having received 15 lb. ammonium sulphate annually for 3 years with those receiving 5 lb. at different degrees of virus severity shows some improvement in growth, fruit set, and yield in trees regularly receiving 15 lb.—Cornell Univ., Ithaca, N.Y.

300. WILCOX, R. B.

Tests of cranberry varieties and seedlings for resistance to the leafhopper vector of false-blossom disease.

*Phytopathology*, 1951, 41: 722-35.

Thirteen named cranberry varieties and 494 seedlings of known parentage were used in selective tests in which the leafhopper vector (*Scleroracis vaccinii*) of the false-blossom virus was given a choice of varieties on which to feed, in order to estimate the relative attractiveness of the varieties as food plants, and hence their liability to contract the disease. Neither susceptibility nor resistance suggests unit dominance; they seem to be the product of numerous factors. One named variety (Shaw's Success) and several hybrid seedlings are more resistant to vector attack than McFarlin which possesses considerable resistance in plantings.

301. KENKNIGHT, G.

The acid test for phony disease of peach.

*Phytopathology*, 1951, 41: 829-32.

This is an extended description of a method already noted (*H.A.*, 21: 2536n). Trichloroacetic acid in methyl alcohol is a particularly good reagent, but the solution is irritating to the skin.

302. COCHRAN, L. C., WEINBERGER, J. H., AND TURNER, W. F.

Natural occurrence of the phony virus in wild chickasaw plums near peach orchards in Georgia.

*Plant Dis. Repr.*, 1951, 35: 181-2.

Wild plums adjacent to peach orchards infected with the phony disease are commonly naturally infected and probably serve as a hold-over reservoir from which new orchards may be infected. Plums growing in fence-rows or thickets under variable conditions of crowding, fertility level, and soil type do not develop characteristic recognizable growth symptoms when infected with the phony virus.—U.S. Dep. Agric., Fort Valley, Georgia.

303. KENKNIGHT, G., BRUER, H. L., AND SHEPARD, C. E.

Occurrence of phony disease in wild plum thickets distant from peach orchards in Spartanburg County, South Carolina.

*Plant Dis. Repr.*, 1951, 35: 183-5, bibl. 4.

By grafting root pieces of wild plum trees, growing in thickets distant from peach orchards, into the stems of peach seedlings it was shown that some of the wild

plum trees were infected with the phony disease virus. The results indicate that phony is endemic or naturalized in wild plum (*Prunus angustifolia*) in Spartanburg County, S. Carolina.—U.S. Dep. Agric., Fort Valley, Georgia.

304. BRUER, H. L., SHEPARD, C. E., AND PERSONS, T. D.

Survey of phony incidence in wild *Prunus*.

*Plant Dis. Repr.*, 1951, 35: 186-8, bibl. 4.

In a survey of wild plums in Alabama, Georgia, Mississippi and South Carolina, taking a chemical test as evidence that the reacting tree is infected with the phony virus, it was found that the virus was present in trees of *Prunus angustifolia*, *P. injuncunda*, and *P. umbellata*.—U.S. Dep. Agric., Fort Valley, Georgia.

305. NYLAND, G., AND SCHLOCKER, A.

Yellow leaf roll of peach.

*Plant Dis. Repr.*, 1951, 35: 33.

Yellow leaf roll has been observed in the field on at least 7 of the 12 common varieties of clingstone peaches in Yuba County, California. Leaf symptoms are a marked yellowing, rolling of leaves upward and inward, marginal scorching and marginal and laminal necrotic spotting, a tendency for the leaves to curve back toward the stem, and, later in the season, marked vein swelling. Affected leaves drop earlier than healthy ones. There seems little doubt that the causal agent is a virus.—Univ. of Calif.

306. CHAMBERLAIN, E. E., ATKINSON, J. D., AND HUNTER, J. A.

Plum-mosaic, a virus disease of plums, peaches and apricots in New Zealand.

*N.Z. J. Sci. Tech. Sec. A*, 1951, 33: 2: 1-16, bibl. 8, illus.

Plum-mosaic produces a wide range of symptoms on different varieties and species or even on the same variety. The leaf symptoms are creamy-white vein-banding, chlorotic lines which sometimes form oak-leaf-like patterns, chlorotic spotting, interveinal chlorosis or mosaic mottling. It occurs naturally on a number of European (*Prunus domestica*) and Japanese (*P. salicina*) plum varieties, Myrobalan (*P. cerasifera*), *P. insititia*, peach, apricot and Mahaleb cherry stock, and it has been transmitted experimentally by budding to nectarine, almond, and sour cherry stock. It is readily transmitted by budding. It is spread by budding or the use of cutting wood from infected trees.—D.S.I.R., Auckland, N.Z.

307. DE FLUITER, H. J., AND THUNG, T. H.

Waarnemingen omtrent de dwergziekte bij framboos en wilde braam. I. (Observations on the *Rubus* stunt-disease in raspberries and wild blackberries. I.) [English summary 11 lines.]

*Tijdschr. Plziekt.*, 1951, 57: 108-14, bibl. 10, illus.

The rubus virus stunt disease [*H.A.*, 21: 1452] has been found in raspberry plantations, in wild blackberries and wild raspberries in Holland. The symptoms of the disease are described and illustrated. Observations on the occurrence of aphids on wild and cultivated blackberries and on raspberries in 1950 are mentioned.

308. MILLER, P. W., AND ALDRICH, F. D.

Studies on the detection of viruses in the leaves of strawberries by the Lindner staining procedure.

*Plant Dis. Repr.*, 1951, 35: 131-3, bibl. 2, illus.

The Lindner method [*H.A.*, 18: 2552, and 20: 1449] with minor modifications was used in testing strawberry leaves for virus infection. From the results it was concluded that the procedure has definite limitations for the detection of strawberry virus diseases. Plants showing severe symptoms of crinkle or of yellows can be positively identified by this technique, but plants mildly affected cannot be reliably detected.—Oregon State College, Corvallis.

309. MILLER, P. W.

Studies on the mechanical transmission of strawberry yellows.

*Plant Dis. Repr.*, 1951, 35: 179-80, bibl. 2.

Positive transmission of strawberry yellows was obtained on a small percentage (6-2%) of the plants when M/100 sodium sulphite was added to leaf juice extracted from infected plants; the percentage may be so small as to exclude this technique as a routine method of transmitting the virus.—Oregon Agricultural Experiment Station.

310. MELLOR, F. C., AND FITZPATRICK, R. E.

Studies of virus diseases of strawberries in British Columbia. II. The separation of the component viruses of yellows.\*

*Canad. J. Bot.*, 1951, 29: 411-20, bibl. 4, being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric., Ottawa*, 1100.

Progressive transfers of *Capitophorus fragaefolii* Kkll. from yellows-infected Marshall plants through a succession of *Fragaria vesca* L. plants resulted in the separation of at least two component viruses. One was of the non-persistent type; it caused reduction in leaf size, mottle, crinkle, and leaf distortion, but the severity and dominance of these symptoms varied so widely that it is assumed that this component itself is a complex of viruses or strains. The other was of the persistent type; its principal effect was to reduce the vigour of the plant although there was some cupping of the leaves, and in the fall, under greenhouse conditions, a transitory yellow mottling of the tips and margins of some of the younger leaves. [Authors' abstract.]

311. BREAKLEY, E. P., AND CAMPBELL, L.

Suppression of strawberry yellows by controlling the aphid vector *Capitophorus fragaefolii* (Kkll.).

*Plant Dis. Repr.*, 1951, 35: 63-9, bibl. 8.

The timely application of insecticides will control the strawberry aphid (*Capitophorus fragaefolii*) and prevent the spread of the yellows disease, if the field is isolated or protected against migratory alatae from nearby infected fields. Parathion, tetraethyl pyrophosphate, and the gamma isomer of benzene hexachloride, when applied as 1% dusts, each gave adequate control of the aphid; DDT and methoxychlor failed to control the aphids and aggravated the spider mite problem.—Washington agric. Exp. Stat., Pullman.

\* For Part I, see *H.A.*, 21: 3387.

312. PRENTICE, I. W., AND WOOLLCOMBE, T. M.  
Resolution of strawberry virus complexes.  
IV. The latent period of virus 3 in the vector.

*Ann. appl. Biol.*, 1951, 38: 389-94, bibl. 6.

With the aphid *Capitophorus fragariae*, the period from first feeding on virus 3-infected strawberry plants to the time of its becoming able to infect another plant was found to be 10-19 days. It was considered that this "latent period" started from the time of first feeding and not from the time of leaving the infected plant, since the period between leaving infected plants and the development of infectivity decreased with increasing duration of feed. In other words, part of the "latent period" could be passed while the insect was on the infected plant. C.W.S.H.

313. MILLER, P. W.

An eastern Oregon *Fragaria vesca* suitable as an indicator for some strawberry virus diseases.

*Plant Dis. Repr.*, 1951, 35: 61-2, bibl. 6, illus.

A native Oregon wild *Fragaria vesca* variant is very sensitive to yellows and crinkle, and has runners of relatively large diameter. In aphid transmission studies, inoculated vigorous plants of this variety, incubated at a temperature of 65° to 70° F., showed visible yellows symptoms in 10 days to 2 weeks after viruliferous aphids from infected plants had been caged thereon. In a month to six weeks after inoculation the plants were usually dead or nearly so.—Oregon State Coll., Corvallis.

314. FRAZIER, N. W.

*Fragaria bracteata* Heller as an indicator plant of strawberry virus.

*Plant Dis. Repr.*, 1951, 35: 127-8, bibl. 4.

This species appeared to be an excellent test plant that showed marked sensitivity to infection, good differentiation of symptoms, and suitable adaptation to year-round greenhouse conditions. Two forms also used as indicator plants in routine work are the East Malling strain of *Fragaria vesca*, and a runnerless type of an Alpine variety of *F. vesca*. From trials with *F. bracteata* it appears that the strawberry viruses most common in California might be broadly separated into two groups based upon their vector relationships as well as symptomatology. One group would include the crinkle and drop types of viruses which are relatively non-persistent in their insect vectors, being retained by them for less than 24 hours. In the second group would fall the relatively persistent viruses which are retained by their vectors for 24 hours or longer and which would include at least one yellows virus.—Calif. agric. Exp. Stat., Berkeley.

315. MILLER, P. W.

Wild strawberries as a source of strawberry virus infection.

*Plant Dis. Repr.*, 1951, 35: 129-30, bibl. 3.

The extent and distribution of virus in three wild strawberry species, *Fragaria chiloensis*, *F. ovalis* and *F. vesca*, in Oregon are tabulated, showing location of the plants tested and the percentage found infected. Some plants of the first two species were found to be infected but none of *F. vesca*. It would appear that the presence of wild strawberries in the vicinity of

cultivated fields in Oregon will henceforth have to be taken into account in the general control programme.—Oregon agric. Exp. Stat., Corvallis.

### Bacteria.

(See also 719.)

316. RIKER, A. J., AND HILDEBRANDT, A. C.

Pathological plant growth.

*Annu. Rev. Microbiol.*, 1951, 5: 223-40, bibl. 95, illus.

A review of the causes of abnormal overgrowths in plants, with particular reference to crown gall caused by *Agrobacterium tumefaciens*.

317. NICOLINI, J. C.

La hormiga como transmisora de la "tuberculosis del olivo". (The ant as a vector of bacterial "tuberculosis" of olives.)

*Idia*, 1951, 4: 37/39: 1, bibl. 1.

A laboratory experiment has shown that "tuberculosis" of olives, caused by *Pseudomonas savastanoi*, can be transmitted by the leaf-cutting ant (*Acromyrmex* sp.).

### Fungi.

(See also 247, 256, 257, 417c, g, l, o, q, r, w.)

318. GIRENKO, V. N., AND GOLLAND, M. I.

The application of illumination analysis for showing the early stages of infection in fruit. [Russian.]

*Priroda*, 1951, 40: 6: 83-4, bibl. 2, illus.

It is claimed that with ultraviolet illumination it is possible to detect diseases of fruit and vegetables in the early stages before they are evident in ordinary light, and an apparatus is described for examining the fluorescence of objects under ultraviolet light. The different fluorescent colouring of citrus fruits when healthy and when attacked by fungi is described.

319. SCHENK, P. J.

Monilia-ziekten van vruchtbomen. (Monilia diseases of fruit trees.)

*Cult. Hand.*, 1951, 17: 98-100, illus.

A popular account of the brown rot diseases caused by *Monilia fructigena* and *M. cinerea*. Recommendations include control of scab (in apple and pear) and codling moth, which cause injuries allowing brown rot infection, winter spraying with 7.5% tar-distillate (fruit tree carbolineum), the destruction of queen wasps and wasps' nests, bird scaring, thinning the fruit, and, for sweet cherries and Morellos, the application of 1.5% bordeaux mixture or copper oxychloride at a corresponding strength.

320. WADE, G. C.

Progress report of brown rot of apricot investigations.

*Tasm. J. Agric.*, 1951, 22: 258-66, bibl. 4, illus.

In Tasmania apricot brown rot (*Sclerotinia fructicola*) is responsible for loss of half the crop in seasons favourable to the disease. The change in ground colour of the fruit, and softening of the fruit as measured by a penetrometer indicate when susceptibility to airborne infection begins. Production of apothecia



from mummified fruit occurs but does not appear important in Tasmania. Experiments show that some of the newer fungicides give moderate control. Of these Isothan and Tetroc cause injury to leaves, and Fermate leaves a conspicuous black deposit on the fruit. Neither Shirlan AG nor Thiotox (tetra methyl thiuram disulphide) cause injury, nor do they adversely affect the canned product.

321. WENZL, H.

Versuche zur Winterbekämpfung der Moniliakrankheit. (Trials of the possible winter control of monilia disease.) [English summary  $\frac{1}{2}$  p.]

*PflSch. Ber. Wien*, 1951, 6: 178-89, bibl. 6.

In trials in Austria thorough wetting of mummified fruits of apricot, *Prunus armeniaca*, and damson, *P. domestica*, by various sprays prevented or greatly reduced the development of sporodochia of *Monilinia laxa*. Of the winter sprays DNC products were the most effective, and tar oil emulsion, lime-sulphur wash, a highly concentrated (50%) 40% potassium (fertilizer) salt, sodium arsenite (1%) and 40% formalin (3%) were also very good. Mineral oils, mineral-tar oil emulsions and copper sprays were unsatisfactory. The effectiveness of a dinitroresol oil was increased by applying in frosty weather. In spite of the satisfactory results obtained by spraying alone, the difficulty of obtaining complete coverage under field conditions makes it advisable to continue the customary collection of mummies.

322. SMITH, H. C.

Verticillium wilt of apricot, gooseberry, strawberry, and tomato.

*N.Z. J. Agric.*, 1951, 83: 129-30, illus.

Wilt caused by *Verticillium dahliae* occurs in all the important fruit-growing areas in New Zealand, where apricot, gooseberry, strawberry, and tomato are the main fruit crops affected. The factors associated with the spread of the fungus and the disease symptoms are described, and the known host range of the disease in New Zealand is given. In addition to fruit trees (apricot, peach, plum) the hosts include certain small fruits (strawberry, gooseberry, raspberry, youngberry), field crops, flowers, and weeds.

323. WILKINSON, E. H.

Dry eye rot of apples.

*Fruitgrower*, 1951, No. 2911, pp. 609-10, illus.

The symptoms, initiation and development of dry eye rot caused by *Botrytis cinerea* are briefly described. The disease usually first appears in England towards the end of July, but very rarely develops into total rot in storage. Despite this, it is suggested that all contaminated fruit should be eliminated.

324. WENZL, H., CREUZBURG, U., AND HANSPETER, A.

Ergebnisse von Apfelschorfversuchen 1948-1950. (Results of trials for the control of apple scab in 1948-1950.)

*PflSch. Ber. Wien*, 1951, 7: 16-22, bibl. 3.

In comparative trials in Austria neutral lead arsenate added to lime-sulphur was more effective than acid lead arsenate, and the lime-sulphur preparation "Baumol" and commercial lime-sulphur containing

the same amounts of polysulphide were about equal. The addition of copper oxychloride to lime-sulphur was found beneficial. Of the synthetic-organic fungicides Pomarsol (tetramethyl thiuram disulphide), applied as a post-blossom spray, was successful.

325. COHEN, S. I.

Effectiveness of three phenyl mercury formulations for the control of apple scab.

Abstr. in *Phytopathology*, 1951, 41: 657.

The chemicals studied were Puratized Agricultural Spray, Puratized Apple Spray, and Puratized 806. Two years' results for 6 varieties showed consistently equal control.

326. DARPOUX, H., AND FAIVRE-AMIOT, A.

Action curative de quelques substances antibiotiques et d'un produit organo-mercurique sur la tavelure du pommier. (The curative action of certain antibiotics and of an organo-mercuric on apple scab.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 136-9.

These preliminary tests show that antibiotic substances secreted by *Aspergillus niger* and *Penicillium claviforme*, and an organo-mercuric (ammonium phenyl mercury triethanol lactate), applied during the incubation period, reduced the appearance of apple scab lesions by 60 to 80%.

327. LARGE, J. R.

Control of scab and other foliage diseases of pecan.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 91.

In 1949 the standard schedule of 4 applications of bordeaux mixture was more effective in controlling pecan scab than an equal number of other treatments tried. Two applications of bordeaux mixture, followed by two applications of 2-100 zerlate (ziram) or 2-100 karbam white (ziram), were, however, better than the standard bordeaux schedule. In 1950 the addition of 2 oz. of a spreader-sticker (Triton 1956) to 100 gal. of zerlate gave scab control on the foliage equal to that obtained with bordeaux mixture. Nursery blight, *Elsinoe randii*, of pecans was also controlled by bordeaux, zerlate and crag 658.

328. DEMAREE, J. B., AND MORROW, E. B.

Relative resistance of some blueberry varieties and selections to stem canker in North Carolina.

*Plant Dis. Repr.*, 1951, 35: 136-41, illus.

The blueberry (*Vaccinium australe*) stem canker fungus, *Phylospora corticis*, causes much damage to bushes of some varieties by girdling and killing canes and scaffold branches, thus materially reducing yields. It makes some otherwise desirable varieties unprofitable, the most susceptible varieties being worthless. There are some North Carolina selections with excellent fruit characters combined with high stem canker resistance available for unrestricted propagation.—N.C. agric. Exp. Stat.

329. GRAVES, A. H.

Blight resistance in the chestnut.

*Brooklyn bot. Gdn Rec.*, 1951, 7: 138-9, illus.

A brief note on work carried out since 1930 in the United States in breeding blight-resistant timber type chestnuts [see also *H.A.*, 21: 2404]. It is suggested

that the resistance is in some way connected with the presence of tannin in the bark, a substance which occurs abundantly in the resistant Chinese chestnut, but not at all or very little in the American species.

330. DAVIDOV, P. H.

**The application of mycolytic bacteria in the control of American gooseberry mildew and other diseases of plants.** [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 9: 35-8, bibl. 7.

It is claimed that American gooseberry mildew (*Sphaerotheca mors-uvae*) and hop powdery mildew (*Sphaerotheca humuli*) can be controlled by spraying the plants with a dilute extract of cow dung. The effect is explained as being brought about by mycolytic bacteria in the cow dung.

331. POWELL, D.

**Phygon XL for the control of peach blossom blight.**

*Plant Dis. Repr.*, 1951, 35: 76-7.

Sprays containing Phygon XL were superior to other treatments in reducing blossom blight infection on peaches caused by *Sclerotinia fructicola*. By increasing the control of such infection during the blossom period it is possible to retard the rate of development of the preharvest fruit infection.—University of Illinois.

332. TOGLIANI, F.

**Osservazioni sulle alterazioni dei tessuti fogliari nelle piante di pesco colpite dal mal del piombo. (Observations on the variations of leaf tissues of peach trees affected by silver-leaf.)** [English summary 8 lines.]

*Ann. Sper. agrar.*, 1951, 5: 593-606.

The author describes the morphological and histological changes of peach leaves caused by silver-leaf disease and discusses the findings of other workers. He has observed two different forms of the disease on several varieties and in several places in Italy. The one (called the quick type) causes deformation, chlorosis and partial silvering of the upper surface of the leaves, the lower surfaces appearing rough. This form appears in spring, first increasing, then decreasing and disappearing in full summer. The other (called the slow type) appears in July-August, showing uniform silvering of the whole upper leaf surface. Microscopic examination of leaves affected by the quick type shows air vesicles between epidermis and palisade tissues and in the spongy tissues of the leaves, hypertrophy of epidermal cells and the presence of crystals of calcium oxalate in the mesophyll cells. With the slow type microscopic examination shows that the tissue structure is normal except for the presence of crystals of calcium oxalate in the epidermal cells and in some perivasal parenchyma. The author considers the present work preliminary to a more complete study of the biochemistry of the affected plants.

333. GROSJEAN, J.

**Onderzoekingen over de mogelijkheid van een bestrijding van de loodglansziekte volgens de boorgat-methode. (The possibility of controlling silver-leaf disease by the bore hole method.)** [English summary 5 lines.]

*Tijdschr. Plziekt.*, 1951, 57: 103-8, bibl. 6.

Introducing chemicals into trees by bore holes has given promising results against silver-leaf disease in plums, pears, peaches and cherries. Solids gave better results than liquids. With oxyquinoline sulphate in the solid state a significant recovery was obtained and in some cases even a total recovery.

334. ORSENIGO, M.

**Sintomatologia e epidemiologia in un caso di parassitismo *Nectria galligena* su piante di pero. (Symptomatology and epidemiology of *Nectria galligena* on pear trees.)**

*Not. Mal. Piante*, 1951, No. 15, pp. 66-7, bibl. 2, illus.

Serious infection of Williams pear trees by *Nectria galligena*, accompanied by a splitting and rolling back of the outer bark, is described.

335. GAGNOTTO, A.-V.

**Osservazioni su un cancro dei rami di pero. (Observations on a canker of pear branches.)**

*Ann. Sper. agrar.*, 1951, 5: 489-97, bibl. 8.

The author reports on a canker on pear branches at Trecastagni in Sicily. She describes the development of the disease on the tree. It is thought to be caused by *Cylindrocarpum mali* (All.) Wr and is controllable by frequent applications of bordeaux mixture.

336. FALL, J.

**Studies on fungus parasites of strawberry leaves in Ontario.**

*Canad. J. Bot.*, 1951, 29: 299-315, bibl. 11, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric., Ottawa*, 1073.

Four fungi were isolated from lesions on strawberry foliage in Ontario during the growing seasons of 1948 and 1949. They are *Mycosphaerella fragariae* (Tul.) Lindau, *Diplocarpon earliana* (Ell. & Ev.) Wolf, *Dendrophoma obscurans* (Ell. & Ev.) H. W. And., and *Gnomonia fructicola* (Arnaud) n. comb. (*Zythia fragariae* Laibach), and they cause the diseases known as leaf spot, leaf scorch, leaf blight and leaf blotch respectively. Apparently this is the first report of *Zythia fragariae* in North America and of *Dendrophoma obscurans* in Canada. From field surveys, strawberry varieties were found to vary in resistance, especially to spot and scorch, and marked differences in seasonal distribution of the diseases were also evident. Spot was most prevalent in the spring and fall, scorch increased in severity during the warmer months, and blight became prominent after the cropping period. As a result of inoculation with *M. fragariae* only the middle-aged leaves of vigorously growing strawberry plants developed lesions. Adding strips of strawberry leaves to a suspension of conidia of *Diplocarpon earliana* greatly enhanced spore germination. Only leaves which are old or middle-aged develop scorch lesions, and these may be blotchy or diffuse depending on the variety. *Dendrophoma obscurans* appears to attack mainly the older leaves near the margins. The name *Gnomonia fructicola* is proposed for the fungus *Gnomonia fragariae* Klebahn form *fructicola* Arnaud. [From author's abstract.]

337. STODDARD, E. M.

**Control of strawberry red stele by chemotherapy.**

*Phytopathology*, 1951, 41: 858.

The red stele (red core) disease of strawberry, caused by *Phytophthora fragariae*, has been controlled by soil applications of disodium ethylene bisdithiocarbamate (Dithane D14). The preparation, at a concentration of 1.5 parts per 100 parts of water, was injected under pressure into the soil. The entire infested area was treated, as well as a band 10 ft. wide on the perimeter of the area. The time was early May as the plants were starting to bloom, and the rate of application was approximately 200 gal. per acre. Further spread of the disease was stopped immediately with no injury to healthy plants in the adjacent treated band. A second treatment was made after picking. No spread of the disease occurred in the same or the following year and healthy plants set in the treated infested area remained healthy.—Conn. agric. Exp. Stat. [For shorter article, see *Ibidem*, 41: 34; *H.A.*, 21: 2469].

338. SCOTT, D. H., AND OTHERS.

Further studies on the response of strawberry varieties and selections to strains of the red stele root disease fungus.

*Plant Dis. Repr.*, 1951, 35: 134-5, bibl. 3.

In tests with strawberry varieties in relation to their susceptibility to the two strains of *Phytophthora fragariae* (*H.A.*, 20: 1478) the cause of red stele (red core) rot, the variety Suwannee was susceptible to both strains, while Climax, Fairland, Redcrop and Vermilion were all very resistant to strain A and susceptible to strain S. Two selections, US3535 and US3538, were moderately resistant to both strains.—Maryland agric. Exp. Stat.

339. KEYWORTH, W. G., AND BENNETT, M.

Verticillium wilt of the strawberry.

*J. hort. Sci.*, 1951, 26: 304-16, bibl. 16, illus.

This disease is caused by *Verticillium albo-atrum* and by *V. dahliae*. The symptoms as observed on the Huxley variety start with one or more of the outer leaves assuming a grey-green, slightly silvery appearance or sometimes a reddish colour. Bluish-black lesions appear on the petioles of such leaves, the laminae become gradually dry and brown and the leaves eventually lie flat on the ground. At this stage the base of the petiole is noticeably rotted. Later more leaves wither and in a few weeks all the older leaves are dead. Eventually the whole plant dies. If the crown of an infected plant is cut transversely, a dark brown discoloration of some of the vascular bundles may be noted. The disease causes the greatest losses in the first year of growth and is thus most important in runner beds. Infection apparently comes from the soil, and there is evidence that this is affected by prior cropping with potatoes. None of the common British varieties is resistant and no immediate control measures can be recommended.—East Malling Research Station.

340. OERTLI, H.

Der Kampf gegen die Peronospora in der Rebschule. (The control of downy mildew in the vine nursery.)

*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 425-9, illus.

Very satisfactory results were obtained in a Swiss nursery with M555, a new organic chemical with a carbamate basis. The addition of 0.25% bordeaux

mixture or 0.1% Cupromaag to 0.2-0.3% M555 applied at weekly intervals gave excellent control of downy mildew without damaging young plants either in the nursery or in newly planted vineyards.

341. HEWITT, W. B.

Grape dead-arm control.

*Plant Dis. Repr.*, 1951, 35: 142-3, bibl. 3.

Table grape varieties, Tokay, Olivette blanche, and Cornichon, in certain areas of California have been severely affected by dead-arm disease (*Cryptosporella viticola*). Leaf, shoot, cluster, and cane spotting has been the most conspicuous symptom; killing of spurs, arms, and even entire vines has occurred after two or more consecutive seasons very favourable to the development of spring infections. From trials in 1950, DN-289 (dinitro sec. butylphenol triethanolamine 38%) appears to have great promise as a spray control for spring infections.—Calif. Univ.

*Nematodes.*

(See also 247.)

342. RITTER, M.

Les nematodes parasites des plantes horticoles. (The nematodes parasitic on horticultural plants.)

*Jardins Fr.*, 1951, 5: 157-73, bibl. 29, illus.

An account is given of the biology, damage done and control of the 3 principal types of nematode parasitic on horticultural plants, Tylenchinae, Heterodinae and Aphelenchinae.

343. DAY, L. H., AND SERR, E. F.

Comparative resistance of rootstocks of fruit and nut trees to attack by a root-lesion or meadow nematode.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 150-4, bibl. 5, illus.

Increasing damage has been done to fruit and nut trees in California by the nematode *Pratylenchus vulnus*. A large number of species were planted during 1945-7 and infected by placing a shovelful of soil containing nematodes around the roots of each tree when it was planted. The common stocks of apricots, apples, pears and quinces were resistant. None of the peach stocks was fully resistant, though Bokhara and Yunnan PI 55885 were less susceptible than the rest. Of the plums, Etter's Best, Bruce and Macedonian Wild Plum were resistant. All walnuts, figs and olives were susceptible. The wingnuts, *Pterocarya stenoptera* and *P. rehderiana*, were resistant. C.W.S.H.

*Mites.*

344. CUTRIGHT, C. R.

Late season control of European red mite.

*J. econ. Ent.*, 1951, 44: 363-7.

From studies conducted over 10 years in Ohio it is concluded that European red mite populations developing late in the season may be serious but never so dangerous as those developing in June-July; predators are of minor importance in late season control; populations do not increase appreciably after 1 September; and one spray application of an acaricide such as parathion or EPN after 1 August will give commercial control.



345. LIENK, S. E., AND CHAPMAN, P. J.

**Orchard mite studies in 1950.***J. econ. Ent.*, 1951, 44: 301-6, bibl. 3, being*J. Pap. N.Y. St. agric. Exp. Stat.* 847.

Of the 4 species of mite that occur in western New York apple orchards, the European red mite, *Paratetranychus pilosus*, and the two spotted spider mite, *Tetranychus bimaculatus*, are major pests. Very good early season control of European red mites was obtained by tetraethyl pyrophosphate, 1% petroleum oil, and p-chlorophenyl p-chlorobenzene-sulphonate, when the applications were made just before bloom. Of 16 materials tested to combat summer infestations of both mites, 8 were organo-phosphorous compounds, all of which were effective. Although in trials single treatments of some of these compounds appeared satisfactory, for commercial practice 2 applications at 10 days interval are recommended.

346. JORDAN, C., AND V. SENGBUSCH, R.

Bekämpfung von Milbenschäden in Erdbeerkulturen. (**Mite control in strawberries.**)Reprinted from *Gartenwelt*, 1951, 51: 139-40, illus.

For the control of strawberry mite, *Tarsonemus pallidus*, spraying three times a week with 0.03% E605 forte and dipping young planting material in the same solution is recommended [see also *H.A.*, 21: 3414]. The breeding of mite resistant, productive strawberry varieties is stated to be possible.

347. SMITH, L. M., AND STAFFORD, E. M.

**Grape bud mite problem.***Calif. Agric.*, 1950, 4: 9: 3-4, illus.

It is believed that the bud mite, which injures the internodes within the bud and sometimes kills the terminal growing point, is a strain of the Erineum mite, *Erineum mites*, which produces fuzzy blisters on the leaves. These mites are killed by the sulphur used for controlling mildew. It is thought that the bud mite is a strain which obtains protection from the sulphur treatment by crawling into the buds. Bud mite damage varies greatly from year to year. Large predatory mites feed on the bud mite. Insecticides have so far been unsuccessful, and there is no known method of control. C.W.S.H.

348. BARNES, M. M., AND MCCORNACK, A. A.

**Grape bud mite injury.***Calif. Agric.*, 1951, 5: 1: 5, illus.

It was noted in a Vermont vineyard that March-pruned vines were less affected by bud mites than January-pruned vines. An unreplicated trial at Cucamonga with pruning in November, December, January, February and March gave much less bud mite damage and 80-100% higher yields than the November and March-pruned plots. It is suggested, however, that a replicated, randomized trial is required to confirm this result. C.W.S.H.

**Insect pests.**

(See also 417d, e, i, j, k, t, v, z, 418a.)

349. FROST, S. W.

**Insects that attack the apple in Pennsylvania.***Bull. Pa agric. Exp. Stat.* 535, 1951, pp. 30, bibl. 19, illus.

The chief apple pests are described, with a figure

showing the approximate periods when important insects affect apples, and periods when spray control can be practised; keys are given for their identification.

350. TROUVELOT, B., AND ARNOUX, J.

Particularités de la lutte contre les insectes nuisibles du pommier à cidre et études qu'elles appellent. (**The control of insect pests of cider apples.**)*C.R. Acad. Agric. Fr.*, 1951, 37: 371-3, bibl. 5.

The spray requirements of cider apple trees are discussed in relation to those of dessert varieties. It is said that the former require fewer applications of insecticides than the latter, one put on early as a preventive measure sometimes being enough.

351. REICH, H.

Wenig bekannte Schädlinge im Alten Lande. (**Little-known pests in the Altenland.**)*Mitt. ObstbVersuchsrings Jork*, 1951, 6: 127-30, illus.

Apple leaf moth, *Simaethis pariana*, and tortrix spp., *Tmetocera ocellana* and *Olothreutes variegana*, on apples, and rose leaf hopper, *Typhlocyba rosae*, on plums and apples.

352. ZUNINO, H. A.

Empleo del hexaclorociclohexano en la lucha contra las hormigas podadoras. (**The use of hexachlorocyclohexane for control of leaf-cutting ants.**)*Idia*, 1951, 4: 37/39: 7-9, illus.

A series of field and laboratory trials have shown that when 666 is applied as a dust to the principal entrances and channels of a nest of leaf-cutting ants (*Acromyrmex lundii*) only those ants which come into direct contact with the dust are killed. The insecticide only gives effective control of the colony when it is applied to the interior of the nest, either as a dust injected with a special machine or as a suspension in water. A minimum concentration of 20% is necessary. 666 had no effect on the fungus on which the ants feed. Applied in a paste to the trunks of olive trees it was a very effective repellent.

353. JACOBY, M.

Ensaio para diminuir o gasto de tóxicos e simplificar o combate à formiga saúva. (**Experiments to simplify the control of leafcutting ants and reduce the cost of toxicants used.**)*Bol. Minist. Agric. Rio de J.*, 1946, 35: 7/12: 27-40 [received 1951].

Fumigation of the nests with a combination of hydrocyanic acid to kill the ants and carbon bisulphide to destroy the fungi on which they feed proved to be a simple and economic method of control. The addition of sulphur and carbon tetrachloride to the carbon bisulphide was found necessary.

354. HEINZE, K.

Wirtschaftlich wichtige Blattläuse und ihre Bekämpfung. (**Aphids of economic importance and their control.**)*Flugbl. biol. Bundesanst. Braunschweig*, C 11, 1951, pp. 12, illus.

A review is followed by lists of aphid species which

attack agricultural and horticultural plants, the latter including glasshouse ornamentals, and fruit trees and bushes.

355. LAMBERS, D. H. R.

De overwintering van de perzikbladluis (*Myzus persicae* Sulzer) als ei. (On the hibernation of the peach aphid (*Myzus persicae* Sulzer) in the egg stage.) [English summary ½ p.]

*Tijdschr. PlZiekt.*, 1951, 57: 128-9.

*Myzus persicae* has been found in the Netherlands not only on *Prunus persica* (and ornamental peach = *P. persica* × *P. amygdalus*) but also on *P. serotina* as a winter host. The fundatrices are found almost only on spurs of the trunks of the older trees. The numerous trees of *P. serotina* used in forestry are a menace to agriculture and horticulture in those areas where the peach is very rare. Birds feeding on the fruit serve to distribute this species which is becoming a nuisance on light soils. In Switzerland the author observed severe infestation of *Myzus persicae* on *Prunus nana* (= *P. tenella*). *Phorodon humuli* may also hibernate in the egg stage on *P. serotina*.

356. KRONENBERG, H. G., AND DE FLUITER, H. J.

Resistentie van frambozen tegen de grote frambozenluis *Amphorophora rubi* Kalt. (Resistance in raspberries to *Amphorophora rubi* Kalt.) [English summary ½ p.]

*Tijdschr. PlZiekt.*, 1951, 57: 114-23, bibl. 8.

The occurrence of resistance to *Amphorophora rubi* is described and its relation to breeding raspberries is discussed. Practically no *A. rubi* was found on the varieties Malling Landmark and Milton; only a few aphids were found on Indian Summer, Newburgh and Viking. Most of the other varieties were definitely susceptible in the field and following artificial infestation. The results of infestation trials with *A. rubi* on a number of seedlings from crosses with varieties of different susceptibility suggested that resistance was inherited.

357. HENNER, J.

Untersuchungen über die Anwendbarkeit des Frostspritzverfahrens im Weinbau zur Bekämpfung des Wintereies der Reblaus. (The feasibility of vineyard spraying in frosty weather to control the winter eggs of phylloxera.) [English summary 6 lines.]

*PflSch. Ber. Wien*, 1951, 7: 1-10, bibl. 20.

Results obtained from spraying fruit trees in frosty weather are briefly reviewed. In trials with vines, three winter washes, mineral oil, tar oil and DNC, sprayed at half normal concentration at temperatures below 0° C., to control the eggs of *Dactylosphaera vitifolia*, were more effective than full strength applications made at temperatures above 0° C. No injury was observed on vines treated at freezing temperatures.

358. MINISTRY OF AGRICULTURE, LONDON.

Fruit tree capsid bugs [*Plesiocoris rugicollis* and *Lygus pabulinus*].

*Adv. Leaflet. Minist. Agric. Lond.* 154, 1951, pp. 6, illus.

Control detailed includes the use of combined emulsions of dinitro-ortho-cresol and petroleum oil in the winter, of DDT just when eggs are hatching, and of nicotine sprays added to lime-sulphur apple scab sprays in spring, the last when the first two have been omitted.

359. BESSON, J., MOUTOUS, G., AND ROEHRICH, R. (MME ET M.).

Essais insecticides contre les téléphores de Vic-Bigorre (*Cantharis obscura* L.). (Insecticide trials against the *Cantharis obscura* beetle in Vic-Bigorre.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 84-8.

Further trials against this beetle [see *H.A.*, 18: 1782] are recorded. Treatments should be made from the time the first insects appear, on pears in full bloom, on cherries and peaches also in full bloom but only in certain years, on apples at the flower-bud stage with a second application in full bloom. Effective insecticides are powders of SPC or TTC, and sprays of DDT as an emulsion or with a wetter. Sprays containing DDT have not been injurious to bees if applied when the bees were inactive.

360. BEHR, L.

*Epicometis (Tropinota) hirta* Poda (Col. Scarab.) an Obst in Mitteledeutschland. (Fruit blossom injury due to *Epicometis hirta* in central Germany.)

*NachrBl. dtsh. PflSchDienst, Berlin*, 1951, 5: 133-4, bibl. 5.

In the spring of 1951 the beetle *Epicometis hirta* destroyed the entire fruit blossom in the Sangerhauser district of central Germany. Before the pest began to feed on the apricot and peach blossom it had done great damage to narcissus and tulip flowers in the area. Collection by hand is the only control measure recommended.

361. JAHONTOV, V. V.

The spotted bronze beetle (*Oxythyrea cinctella* Schaum.) a polyphagous pest of field, fruit and ornamental plants in Central Asia. [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 6: 25-8, bibl. 6.

The host plants of *Oxythyrea cinctella* include apple, peach, rose and cucurbitaceous plants, the flowers of which are damaged. On apple the beetle eats the ovary, stamens, and sometimes the petals. Its life-history is outlined with notes on control by DDT dust or Gammexane.

362. RINGS, R. W., AND GOULD, W. A.

Effectiveness of new organic insecticides in controlling plum curculio infesting plums.

*J. econ. Ent.*, 1951, 44: 354-9, bibl. 5.

Of the 9 organic insecticides evaluated over a 3-year period for the control of plum curculio, *Conotrachelus nenuphar*, parathion used at 2 lb. of 15% wettable powder appeared to be the most effective without causing plant injury or imparting off flavour to the plums. Lindane, a refined or high  $\gamma$ -BHC, EPN and methoxychlor were also satisfactory. Results obtained relating to timing indicate that it is advisable to begin spraying at the time of petal fall, and that 2 to 4

treatments, applied at 10-day intervals, are required for commercial control.

363. COX, J. A.

**The plum curculio as a prune pest.**

*Bull. Pa agric. Exp. Stat.* 539, 1951, pp. 23, ill.

In Pennsylvania and other states the plum curculio (*Conotrachelus nenuphar*) is a serious pest of prunes, plums, peaches, apples, and cherries. The damage caused by it is a result of feeding and ovipositing of the adult beetles in the spring, internal feeding of the larvae in the fruit, and feeding punctures in the fruit made by the newly emerged beetles in late summer and autumn. The over-wintered curculios feed early in the season on the blossoms and young foliage, but this type of injury is not important. Three sprays of benzene hexachloride, parathion, lindane, or ethyl p-nitrophenyl thionobenzenephosphonate (EPN-300) should give satisfactory control.

364. GUENNEION-AUBANEL, G.

Action de l'hexachlorocyclohexane (H.C.H.) sur le rhynchite coupe-bourgeon (*Rhynchites coeruleus* de Geer). (The effect of HCH on the apple twig-cutting weevil (*Rhynchites coeruleus* de Geer).)

*C.R. Acad. Agric. Fr.*, 1951, 37: 314-16.

The apple twig-cutting weevil is very sensitive to HCH, which acts both by contact and as a vapour.

365. BULLRICH, K.

Températures de printemps et lutte contre les charançons du pommier. (Spring temperatures and control of apple-blossom weevil.)

*Neue Mitt. Landw.*, 1951, No. 9, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 637.

The most effective time at which to spray for control of apple-blossom weevil is when the adults are mating, but this depends on the temperature sum of the season. The temperature sum can be calculated by adding up the number of degrees above 8° C. that have been registered after the beginning of February and multiplying the sum by the number of hours during which the temperature has been above 8° C. Observations made by the author have shown that mating takes place when the temperature sum has reached 900-1,000 degrees × hours.

366. HANF, M.

Neue Erkenntnisse zur Bekämpfung des Apfelblütenstechers. (New findings in the control of apple blossom weevil.)

*Anz. Schädlingsk.*, 1948, 21: 5: 65-73, from abstr. in *Rev. appl. Ent.*, 1951, 39: 193.

Control sprays must be applied after the migration of the overwintered weevils to the trees, which is dependent on temperature, and before they oviposit. The peak of migration usually occurs shortly before bud-burst, so that a late-dormant spray of dinitro-o-cresol, alone or with tar distillate (fruit-tree carbolineum), can be applied. The timing of the spray is important, the dates varying from year to year, and the period available before bud-burst ranging from less than one to nearly three weeks.

367. MARTIN, H.

Contribution à l'étude du balanin des noisettes (*Balaninus nucum* L.). (The nut weevil.)

*Rev. Path. veg.*, 1949, 28: 1: 3-28, from abstr. in *Rev. appl. Ent.*, 1951, 39: 228-9.

An account of observations in 1946-48 on the bio-nomics and control of *Curculio* (*Balaninus*) *nucum* L., in Tarragona, Spain, where this weevil is a serious pest of cultivated hazel (*Corylus avellana*). The over-wintered adults first appeared at the end of March and emerged in numbers in the second half of April, but as the hazel-nuts were then too young, they fed on various fruits (including persimmon, pear and peach) and migrated to the nuts in May or the beginning of June. In large-scale field trials DDT gave 42-87% control when applied in emulsified solution, but was unsatisfactory in dusts and suspension. DDT should be applied in April to fruit trees and early varieties of hazel and in May or June to the later varieties, as soon as the overwintered weevils appear on them.

368. DELANOUE, P.

Encore la cératite ! (The Mediterranean fruit fly.)

Reprinted from *La Feuille d'Informations vitic. arbor. Tunisie*, 1951, No. 24, pp. 8-18.

The humid summers and mild winters of Tunisia favour the fruit fly [*Ceratitis capitata*], but cold winters reduce its numbers. Wind is an important factor in its dispersal but unfavourable for the fly itself, for it prefers dense and sheltered plantations and very leafy trees. Control by trapping and by soil treatment with HCH is discussed.

369. BROWN, L. R., AND DEWEY, J. E.

Control of the apple leaf-curling midge with DDT in codling moth sprays.

*J. econ. Ent.*, 1951, 44: 425-6, bibl. 2.

Good incidental control of apple leaf-curling midge, *Dasyneura mali*, was obtained by 2 lb. of DDT 50% wettable powder per 100 gal., particularly when applied by a speed sprayer.

370. ANON.

Bladrollers op vruchtbomen. (Fruit tree leaf rollers.)

*Nieuwe Veldbode*, 1951, No. 28, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 636.

A survey made by the Institute for Phytopathological Investigations, Holland, in 1950 showed that over 90% of the leaf rollers infesting Dutch orchards were *Capua reticulana*. Observations on the biology of the pest are recorded. Three periods are considered suitable for applying control sprays: (1) in spring when the overwintering larvae become active, (2) in July when the first generation larvae disperse, and (3) in August when the second generation larvae disperse.

371. CHABOUSSOU, F., MOUTOUS, G., AND ROEHRICH, R.

Essais de protection des cultures fruitières contre le carpocapse (*Laspeyresia pomonella* L.) et contre la tordeuse de pêcher (*Laspeyresia molesta* Busk) en 1950, dans le sud-ouest de la France. (Trials for the control of codling moth and oriental peach moth in south-west France.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 88-93, bibl. 4.



On pome fruits the best results were obtained with SNP, DDT and SPC being less satisfactory. On peaches DDT was effective. For the protection of pears against the oriental peach moth SNP and DDT were effective, while arsenate of lead and sodium fluosilicate were practically useless.

372. KIMURA, J.  
Baggingless [sic] apple growing and the control of fruit moth. [Japanese with English summary 20 lines.]  
[Publ.] Aomori Apple Exp. Stat., received 1951, pp. 18.

Practice in Japan since 1888 has been to bag apples to prevent the ravages of curculios and of the fruit moth, *Carposina sasakii*. The great labour involved has led recently to trials of lime spraying, the use of arsenicals and DDT. Only the last has proved successful.

373. GÜNTART, E., AND HOFFMANN, E.  
Bekämpfung der Apfelblattminiermotte.  
(Control of the apple leaf miner.)  
*Schweiz. Z. Obst- u. Weinb.*, 1951, 60: 374-8, illus.

In 1951, Grapol (an aphicide with 20% nicotine) applied at 0.3% concentration gave good control of the apple leaf miner, *Lyonetia clerkella*, in Switzerland. As the first generations of the miner are of no economic importance, the treatment was given against the second generation in the middle of June and repeated twice at 2-week intervals. To control the third generation 1 or 2 applications may be necessary at the end of August.

374. ARNOUX, J.  
La cheimatobie (*Operopthera brumata*) et les vergers de pommiers à cidre. (The winter moth and cider apple orchard.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 374-7, bibl. 2.

A study of the winter moth populations on cider apple trees at different periods of the year. The autumnal infestation is a good index of the probable larval population the following spring. A table is given showing the percentages of the larvae at different stages of development at different times in April and May.

375. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.  
The currant stem-borer (*Aegeria tipuliformis*).  
*Agric. Gaz. N.S.W.*, 1951, 62: 304, illus.

This clear-wing moth attacks the canes of currants, gooseberries and raspberries in New South Wales. Infested canes may readily be recognized in the spring by the dying-off of young shoots and the presence of under-sized yellowish leaves. In the winter detection is more difficult, but small, dead shoots, or the presence of the sawdust-like frass on various parts of the canes may be noticed. As the moths do not emerge until October or later (in N.S.W.) the early pruning and burning of infested canes or twigs will destroy the caterpillars or pupae within.

376. BESSON, J., AND JOLY, E.  
Essais toxicologiques effectués sur pêche en 1950 contre la tordeuse orientale du pêcher (*Laspeyresia molesta* Busk) à Toulouse. (Trials for the control of the oriental peach moth (*Laspeyresia molesta* Busk) at Toulouse in 1950.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 439-41.

The control of the oriental peach moth on late peach varieties is difficult, but three applications of a DDT preparation during the summer are recommended for trial.

377. BOBB, M. L.  
Field experiments for control of Oriental fruit moth.  
*J. econ. Ent.*, 1951, 44: 418-20, bibl. 2.

Out of 9 materials tested, DDT, test material No. 1 (ethyl p-nitrophenyl thionobenzenephosphonate) and parathion were the most effective in controlling oriental fruit moth, *Grapholitha molesta*, on peaches. Data presented indicate that one spray applied at the peak of moth flight for control of the first and second broods was as effective as sprays applied at the peak of each of the three flights and better than applications made for control of second and third broods.

378. BREakey, E. P.  
Natural control of the orange tortrix in western Washington.  
*J. econ. Ent.*, 1951, 44: 424, bibl. 2.

The orange tortrix, *Argyrotaenia citrana*, introduced to western Washington fairly recently and causing concern to raspberry growers, was found to be controlled very effectively by native parasites, of which *Meteorus argyrotaeniae* is the most important.

379. CHAPMAN, R. K., AND WHIPP, A. A.  
Strawberry leaf roller control in Wisconsin.  
*J. econ. Ent.*, 1951, 44: 424-5, bibl. 1, being *Sci. Pap. Wash. St. agric. Exp. Stat.* 998.

Parathion used either as dust or spray was the only material which gave good control of the strawberry leaf roller, *Ancylys comptana fragariae*, enclosed in the leaves.

380. GERHARDT, P. D., LINDGREN, D. L., AND SINCLAIR, W. B.  
Methyl bromide fumigation of walnuts to control two lepidopterous pests and determination of bromine residue in walnut meats.  
*J. econ. Ent.*, 1951, 44: 384-9, bibl. 1, being *Pap. Calif. Citrus Exp. Stat.* 664.

Satisfactory control of larvae of the navel orangeworm, *Myelois venipars*, in whole walnuts was obtained by fumigating at atmospheric pressure with 2 lb. of methyl bromide per 1,000 cu. ft. for 2 hr., when nuts were in loosely-woven sacks. Larvae of the Mediterranean flour moth, *Ephestia kuehniella*, in sealed double-walled cellophane bags were controlled by 2 lb. of methyl bromide per 1,000 cu. ft. and an exposure of 1 hr., when either sustained or released vacuum was employed. Analyses revealed that vacuum fumigated whole or shelled walnuts may be expected to show high bromide residues.

## 381. ANON.

Psilido del peral (*Chermes pyricola*). (Pear psyllid, *Chermes pyricola*).

*Bol. Estac. exp. Cinco Saltos*, 1951, 3: 5-6.

Pear psyllid was observed for the first time in the upper valley of the Rio Negro, Argentina, in 1949. There are 3 generations a year. Preliminary trials have shown that post-harvest sprays of 2% summer oil, nicotine sulphate+1% summer oil or DDT+1% summer oil give some, but not complete, control.

## 382. BONNEMAISON, L.

Les pucerons des arbres fruitiers et le psylle du poirier. (Fruit tree aphids and pear psylla.)

*Jardins Fr.*, 1951, 5: 35-47, illus.

A review of the biology and control of the most important species of fruit tree aphids is followed by an account of the investigations started by the author in 1949 in France on the biology and control of the pear psylla (*Psylla pyri*). The adults emerge from hibernation at the end of February. There were 5 generations in 1949 and 4 in 1950. Both adults and larvae cause damage by sucking the sap and severe attacks may cause the leaves to fall in August. For control it is advisable to spray either in spring immediately after petal fall or in autumn after harvest. The following insecticides applied on 13 October to an orchard of Passe Crassane pears gave 96-100% kill: SNP in suspension at 22 g. pure product per hl. water, SNP in emulsion at 14 g. pure product, and a mixture of SNP in summer oil and an emulsion of HCH 12% gamma isomer.

## 383. BONNEMAISON, L., AND MISSONNIER, J.

Observations préliminaires sur le psylle du poirier (*Psylla pyri* L.) et essais de traitements. (Preliminary observations on the pear psyllid and control tests.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 57-9.

Of the preparations tested two were particularly effective against the larvae of the pear psyllid, viz. diethyl or paranitrophenyl thiophosphate in suspension or emulsion, and the gamma isomer of HCH in emulsion.

## 384. KUENEN, D. J., AND VAN DE VRIE, M.

Waarnemingen over de biologie en de bestrijding van de appelzaagwesp (*Hoplocampa testudinea* Klug, Hymenopt., Tenthredinidae). (Observations on the biology and control of the apple sawfly.) [English summary 1 p.]

*Tijdschr. PZiekt.*, 1951, 57: 135-57, bibl. 6, illus.

The life-history and habits of the apple sawfly are described, and a brief account is given of the damage caused. Control can be obtained with nicotine, derris, HCH and parathion. The best time for application is just before the larvae hatch. Excellent results can be obtained by spraying with HCH just after petal-fall.

## 385. BÖHM, H.

Untersuchungen über die San José-Schildlaus (*Quadraspidiotus* [Aspidiotus] perniciosus Comst.). (Studies on San José scale.) [English summary ½ p.]

*PflSch. Ber. Wien*, 1951, 6: 65-76, bibl. 16.

Investigations were carried out to study the host plants of this pest in Austria and their influence on its development.

## 386. BÖHM, H.

Dinitro-sec. Butylphenol—ein neues Winterspritzmittel zur Bekämpfung der San José-Schildlaus (*Quadraspidiotus perniciosus* Comst.). (Dinitro-sec-butylphenol—a new winter wash for the control of San José scale.)

*PflSch. Ber. Wien*, 1951, 7: 11-15, bibl. 2.

In trials conducted by the federal institute for plant protection, Vienna, 0.7% TABP (36% dinitro-sec-butylphenol) gave almost 100% control of San José scale and about 90% of eggs of *Aphis pomi*, *Cheimatobia brumata* and *Paratetranychus pilosus*.

## Other pests.

(See also 417u.)

## 387. ANON.

Mr. Robin Bennetts invents unique bird-scaring device.

*Orchard. N.Z.*, 1951, 4: 5-6, illus.

A device stated to be very effective in cherry orchards is described in detail and illustrated to indicate its construction and its use in the orchard. It consists essentially of a glittering and mobile scarecrow.

## 388. LAUE, G., AND MUTZ, H.

Sperlingsbekämpfung mit Giftgetreide.

(Poisoned wheat grains for sparrow control.)

*NachBl. dtsch. PflSchDienst, Berlin*, 1951, 5: 130-3, bibl. 5.

Dyed wheat grains poisoned with zinc phosphide were successfully used to control a mass incidence of sparrows after the birds had been trained to accept the coloured grain.

## 389. SPEYER, W., AND GASOW, H.

Vogelschutz und Vogelabwehr. (Bird protection and bird control.)

*Flugbl. biol. Bundesanst. Braunschweig*, C 16, 1951, pp. 11, illus.

Recommendations made for the protection of useful birds include clauses of German law which govern bird protection, construction of nests to encourage colonization and propagation and control of birds of prey. Suggestions are made for the control of harmful birds such as sparrows, greenfinches, blackbirds, and the value of various bird scarers is discussed.

## Antibiotics.

(See also 417f, 534, 550, 719, 770m, 897.)

## 390. CERCÓS, A. P.

Antibiótico DINR.49-1 (Fungocina) producido por *Bacillus subtilis* con actividad sobre hongos patógenos de animales y vegetales. (Antibiotic DINR.49-1 (Fungocina), produced by *Bacillus subtilis*, and active against pathogenic fungi of animals and plants.) [English summary ½ p.]

*Rev. Invest. agric. B. Aires*, 1950, 4: 325-35, bibl. 8, illus., being *Publ. Inst. Fitotec. Minist. Agric. B. Aires* 105.

A study is reported of the isolation and purification of the antibiotic "fungocina", obtained from *Bacillus subtilis*, and of its physico-chemical and biological properties. Among the plant pathogens against which it showed activity *in vitro* are *Rhizoctonia* sp., *Colletotrichum* sp., *Fusarium* sp., *Alternaria solani* and *Phytophthora* sp. It was also found to be active *in vivo* against *Phytophthora* on potato plants.

391. RUDAKOV, I. F.

The volatile substances of clematis. [Russian.]

*Biohimija*, 1951, 16: 435-40, bibl. 44.

A volatile substance obtained from the fresh stems and leaves of eight species of *Clematis* is toxic to bacteria, microscopic fungi, and protozoa. It is referred to as a phytoncide, its active principle being protoanemonin.

*Fungicides.*

(See also 196, 417s, 725.)

392. PALMITER, D. H., AND SMOCK, R. M.  
Preliminary report on fungicides in relation to apple yield and quality.

Abstr. in *Phytopathology*, 1951, 41: 659.

Best scab control was obtained with Tag, Fermate, and Phygon; largest fruit with Tag and Phygon; best fruit colour with Fermate, Phygon, and sulphur followed by Fermate; best yield with sulphur, sulphur followed by Fermate, and straight Fermate; and least drop with Tag and sulphur followed by Fermate.

393. THURSTON, H. W., Jr.

Organic fungicides on apples in 1950.

Abstr. in *Phytopathology*, 1951, 41: 660.

In trials in Pennsylvania in 1950 the best results were obtained with split schedules in which mercury (Tag 331) was used before bloom and either glyoxalidine (Crag 341) or magnetic sulphur in post-bloom sprays. The glossiest fruit (Stayman) as well as the least russeted was obtained with the use of mercury followed by glyoxalidine.

394. MARSH, R. W.

New fungicides and the sulphur shortage.

*Fruit Year Book 1951-2*, 1951, pp. 55-8.

After dealing with methods of economizing in lime-sulphur applications during the present sulphur shortage and evaluating possible substitutes, the author concludes: "The grower who is able to obtain lime-sulphur should husband his stock and use it for pinkbud and petal-fall sprays on the scab-susceptible dessert varieties (e.g. Cox and Worcester). Bordeaux mixture can be safely used for the first (green-cluster) scab spray. For summer spraying the choice of material will probably be determined by the availability of the lime-sulphur substitutes. Thiram and ferbam sprays should be viewed as roughly equivalent to dispersible sulphurs, requiring frequent applications to maintain effectiveness. The use of these materials, or of mercury or copper sprays, in the place of lime-sulphur will probably add to the problems of red spider control; the need for additional acaricidal sprays is yet another of the difficulties to be anticipated as a result of the sulphur shortage."

395. HORSFALL, J. G.

Relative specificity of *Sclerotinia* and *Stemphylium* to toxicants.

Abstr. in *Phytopathology*, 1951, 41: 658.

The fungitoxicity of about 1,000 organic compounds was tested against *Sclerotinia fructicola* [the brown rot fungus prevalent in America] and *Stemphylium sarciniforme*. Toxicity to *Sclerotinia* was shown by basic-NH compounds, by hydrazine which can react with sugars, and phenolic hydroxyls. The C=O group is especially toxic to *Sclerotinia*.

396. BAMBACIONI, V. M.

Su una presunta modificazione morfologica e fisiologica prodotta dalla poltiglia bordellese sull'epicarpo delle olive. (A presumed morphological and physiological modification of the epicarp of the olive by bordeaux mixture.) [English summary 5 lines.]

*Ann. Sper. agrar.*, 1951, 5: 269-72.

French work having indicated that any possible repellent action of bordeaux mixture against the olive fly is due to changes brought about in the epicarp, Italian workers have tried to confirm this, but neither the present author nor Russo has been able to establish any important changes resulting from the use of bordeaux.

397. ABIUSSO, N. G.

Experiencias preliminares sobre toxicidad a los hongos del cloruro de N-propil tetradecanil amido dimetil bencil amonio. (Preliminary experiments on the toxicity to fungi of N-propyl tetradecanyl amine dimethyl benzyl ammonium chloride.)

*Idia*, 1951, 4: 37/39: 33-6, bibl. 7.

At a concentration of 1:100,000 this quaternary ammonium compound completely inhibited germination of the spores of *Fusarium solani*, *Tilletia tritici* and *Gloeosporium cyclaminis*. It caused no damage when sprayed onto tomato plants at a concentration of 1:1,000. The germination capacity of wheat seeds, treated with a 5:1,000 solution of the compound for up to 24 hours, was scarcely affected.

398. CROWDY, S. H., AND WAIN, R. L.

Studies on systemic fungicides. I. Fungicidal properties of the aryloxyalkylcarboxylic acids.

*Ann. appl. Biol.*, 1951, 38: 318-33, bibl. 18.

The systemic activity of aryloxyalkylcarboxylic acids on chocolate spot, *Botrytis cinerea*, of broad beans, *Vicia faba*, was assessed by experiments entailing the standing of seedlings in solutions, soil treatment, stem injection and leaf spraying. In the experiments with young seedlings the solutions contained 10 p.p.m. of the compounds used and the roots were immersed for 2-3 weeks. The most promising compounds were 2:4:6 trichlorophenoxyacetic acid, pentachlorophenoxyacetic acid and pentachlorophenoxy-isobutyric acid. These reduced the size of fungus lesions. Fungicidal activity was also shown in the soil, stem injection and leaf spraying tests. The preparation of the compounds used is described, and the success or failure of the various compounds used is fully discussed.

C.W.S.H.



399. WENZL, H., AND MÜLLER-FEMBECK, J.  
Der Einfluss der Schichtdicke von Wundverschlussmitteln auf die Wundüberwallung.  
(The influence of the thickness of wound dressing on callus formation.)  
*Bodenkultur*, 1951, 5: 223-30, bibl. 3, illus.  
Experiments with various wound-dressings on fruit trees have shown that callusing over of pruning wounds depends on the nature and the thickness of the dressing used. When testing dressings at least two different thicknesses are recommended for trial. Materials containing tar should be applied only very thinly around the edges but more thickly over the middle, the thickness depending on the size of the wound.
- Insecticides.*
- (See also 417h, n, s, 418b, e, 720-724.)
400. MACLAGAN, D. S.  
Modern insecticides and the balance of nature.  
*Nature*, 1951, 168: 360-2.  
Substance of a paper read on 10 August, 1951, before Section D (Zoology) of the British Association meeting at Edinburgh.
401. LORD, F. T.  
The influence of spray programs on the fauna of apple orchards in Nova Scotia: II.\*  
Oystershell scale, *Lepidosaphes ulmi* (L.).  
*Canadian Ent.*, 1947, 79: 196-209, bibl. 8 [received 1951].  
PICKETT, A. D.  
The philosophy of orchard insect control.  
Reprinted from 79th A.R. ent. Soc. Ontario 1948, pp. 5, bibl. 4 [received 1951].  
PICKETT, A. D.  
A critique on insect chemical control methods.  
Reprinted from *Canadian Ent.*, 1949, Vol. 81, No. 3, pp. 10, bibl. 11 [received 1951].  
Pickett, who has now been working as an entomologist for 13 years in Nova Scotian orchards, believes and very cogently states his reasons for believing that the widespread and more or less general use of chemicals which may be highly toxic to a wide variety of species of living things is dangerous and may set up "chain reactions" with far-reaching results. These three papers are directly concerned with this idea.
402. MAYER, K.  
Zur Problematik der neuen Kontaktinsektizide. (The problems raised by the new contact insecticides.)  
*NachrBl. dtsh. PflSchDienst*, Berlin, 1951, 5: 81-5, bibl. 29.  
The papers cited in the bibliography are all of recent date and, with few exceptions, by German workers.
403. FENNAH, R. G.  
Some new insecticides.  
*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 377-91.  
Notes on formulations with particular reference to their use in the tropics.
404. THIEM, E.  
Eigenschaften und Wirkungsweise des Hexachlorcyclohexans. (Properties and action of BHC.)  
*NachrBl. dtsh. PflSchDienst*, Berlin, 1951, 5: 24-30, bibl. 11.  
On freshly treated plants BHC was found to act both as a contact and a respiratory poison. Later, when the active agent was absorbed, only insects feeding on the plant were injured. The insecticide was shown to be translocated in potato plants. Painting the older leaves with a BHC paste imparted to young leaves a high toxicity to Colorado beetle larvae. Leaves of plants that were raised from tubers dusted with a BHC preparation also had insecticidal properties. Watering the soil with a BHC emulsion had a similar effect.—Potato Res. Stat. of the Biol. Zentralanst. Mühlhausen, Thüringen.
405. HAEFLINGER, E.  
D.D.T. en bijen. (DDT and bees.)  
*Nieuwe Veldbode*, 1950, No. 36, from abstr. in *Rev. Agric. Brux.*, 1950, 3: 990-1.  
The effect of Gesarol dust and Gesarol 50 (a suspension of DDT) as contact insecticides on bees was determined at 3 different temperatures. At 20° C. all the treated bees were dead after 1 day, while at 36° C. the insecticides had no effect. At 28° C. the suspension was toxic but the dust was not. As a stomach poison DDT was also less toxic to bees at a high temperature than at a low one. This, however, was not so with HCH, calcium arsenate and parathion. It is concluded that the danger from DDT which is brought into the hives is small.
406. VAN DER LAAN, P. A.  
Het gevaar van toepassing van enige organische fosforverbindingen als insecticide in de landbouw in Indonesië. (The danger of using certain organic phosphorus compounds as insecticides in Indonesia.)  
*Landbouw*, 1951, 23: 108-10, bibl. 5, and *Bergcultures*, 1951, 20: 57-61.  
The use of organic phosphorus insecticides is considered inadvisable in Indonesia, as they destroy beneficial insects and the precautions taken by workers in America and Europe are there impracticable.
407. LUDVIK, G. F., AND DECKER, G. C.  
The insecticidal properties of some esters of phosphorus acids.  
*J. econ. Ent.*, 1951, 44: 405-18, bibl. 14.  
One hundred and thirty-two organic esters of phosphorus acids, namely metaphosphoric, orthophosphoric, pyrophosphoric, triphosphoric, phosphorous, and alkyl- and arylphosphoric acid, were examined for possible activity as contact insecticides against the green peach aphid, *Myzus persicae*, and the house fly, *Musca domestica*, and 26 were further tested against a more resistant aphid, *Myzus porosus*.
408. LHOSTE, J., AND LEBOVICI, C.  
Sur le pouvoir aphicide de l'octaméthylpyrophosphoramide. (The aphicidal properties of octamethylpyrophosphoramide.)  
*Parasitica*, 1951, 7: 37-44, bibl. 10.  
Experiments were carried out on the aphids of bean (*Vicia faba*) and chrysanthemum. The conclusion is

\* For I, see H.A., 7: 723.

drawn that octamethylpyrophosphoramidate (OMPP) is an insecticide of some importance. Its action as a contact insecticide is, however, inferior to that of parathion and in certain cases the latter and TEPP are usually sufficient to save crops infested by aphids. The most interesting property of OMPP is its movement and persistence in the treated plants.

409. RUZAEV, K. S.

The application of hexachloran and DDT in vineyards. [Russian.]

*Vinodelie i Vinogradarstvo*, 1951, No. 9, pp. 44-5.

Trials were made to ascertain the effect on vines and their fruit of spraying and dusting with DDT and hexachloran. With the exception of hexachloran dust there was no noticeable change in the sugar content of the grapes. The hexachloran dust caused a reduction in the alcohol content of the wine and increased acidity in the berries and in the wine. Hexachloran and DDT dusts can be applied up to the time of blossoming but not as the fruit is ripening.

410. BERAN, F.

Die Frostspritzung—eine neue Möglichkeit. (Spraying in frosty weather—a new possibility.)

*Gartenwelt*, [undated], from abstr. in *Rev. Agric. Brux.*, 1951, 4: 908-9.

Trials have shown that the effect of winter oil sprays is about doubled when they are applied in frosty weather, compared with applications at temperatures above 0° C. When a carbolineum emulsion containing 3.5% oil was used, an oil deposit of 0.35 mg./cm<sup>2</sup> was obtained at temperatures above zero, and 0.79 mg./cm<sup>2</sup> at -4.5° C. A mixture of DNC and mineral oils or yellow oils was also more effective in frosty weather, and the concentration could therefore be reduced [see also *H.A.*, 19: 1104, 2964, and 21: 412].

### *Spraying methods and apparatus.*

(See also 91, 92.)

411. CREASY, L. E., AND MAYEUX, M. M.

The sprayer and its use.

*Publ. La Div. agric. Ext.* 1085, 1951, pp. 29, illus.

The purpose of this bulletin is to describe the different kinds of spray equipment and how each works. The first part is devoted to methods of applying sprays and includes information on weed control spraying in sugar cane, row crop spraying of potatoes and cotton and orchard spraying. The second and more detailed part deals with the sprayer itself and discusses, with the aid of diagrams and formulae, power requirements, booms, agitation, tanks, screens, nozzles, boom control valves and pressure gauges and regulators. Methods of calculating and controlling the rate of discharge of sprays are described both for blanket and row crop spraying.

412. GARTON, J. E.

A graphic solution of airplane sprayer problems.

*Misc. Publ. Okla. agric. Exp. Stat.* MP-20, 1951, pp. 3.

Graphs show how to deal with different variables, viz.

ground speed of plane, width of swathe to be sprayed, total nozzle discharge and rate of application, in relation to one another.

### *Spray damage.*

413. REFATTI, E.

Sulla presunta fitotossicità degli olii d'ant-racene. (On the presumed toxicity of anthracene oils.)

*Nat. Mal. Piante*, 1951, No. 15, p. 13.

Adult pear trees were treated 12 times with an emulsion of 15% anthracene oil from May onwards at 10-day intervals without injury.

414. BOUGARD, M.

Un aspect de la phytotoxicité du cuivre en arboriculture fruitière. (One aspect of the phytotoxicity of copper in fruitgrowing.)

*Fruit belge*, 1951, 19: 161-7.

The phytotoxicity of sprays containing copper and sulphur preparations is discussed, with tabulated data for apple trees. It is concluded that copper sprays check the development of the young growth, and that, in general, sulphur sprays are preferable.

415. TAYLOR, G. G.

Spray injury from use of lead arsenate on apple trees.

*N.Z. J. Sci. Tech. Sec. A*, 1951, 32: 6: 39-48, bibl. 7, illus.

Lead arsenate mixed in artesian water (temporary hardness 7.0 grams per gal.) can cause severe foliage injury and slight to moderate fruit injury on apple trees of the Sturmer variety in the Hawkes Bay District. Addition of 3 lb. hydrated lime to 100 gal. spray containing 1½ lb. lead arsenate reduces, but does not prevent, foliage damage. When lime-sulphur plus colloidal sulphur is combined with lead arsenate plus hydrated lime, injury is negligible, but if colloidal sulphur is omitted from the mixture foliage damage becomes very severe. Increase in concentration of lime-sulphur increases the severity of leaf damage. Fruit injury increases with leaf damage but not in the same proportion. Addition of the wetting agent Agral 2 to lead arsenate plus lime-sulphur and colloidal sulphur causes a characteristic type of injury on fruit, but the inclusion of hydrated lime reduces the severity of injury which then shows as fruit russet.—D.S.I.R., Auckland, N.Z.

416. PICKETT, W. F., FISH, A. S., JR., AND KWONG SHUE SHAN.

The influence of certain organic spray materials on the photosynthetic activity of peach and apple foliage.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 111-14, illus.

Spraying on three occasions in July with chlordane, DDT and fermetate sprays had no effect on photosynthetic activity of peach leaves as measured by differences in dry weight of punch disc samples taken for several days after the sprayings. With apple leaves, although statistical significance in comparison with control was not reached, there was a strong suggestion that fermetate increased activity while parathion reduced it. Microscopical examination of

the leaf tissue showed that the palissade tissue of chlordane sprayed leaves was significantly thicker than that of parathion sprayed leaves. C.W.S.H.

### Noted.

417. a (AOMORI APPLE EXPERIMENT STATION.)  
Hail damage to apples [in June 1949]. [Japanese with English summary 2 pp.] [Publ.] *Aomori Apple Exp. Stat.* [received 1951], pp. 31, illus.  
Devastation over a small area described and illustrated.
- b BEARD, J. W.  
Physical and chemical characteristics of viruses.  
*Annu. Rev. Microbiol.*, 1951, 5: 264-76, bibl. 137.
- c BÖMEKE, H.  
Eine wenig bekannte Krankheit auf Kirschblättern. (A little known disease of cherry leaves.)  
*Mitt. ObstbVersuchsrings Jork*, 1951, 6: 145, illus.  
Caused by an Ascomycete, most probably *Cylindrosporium padi*.
- d CHABOUSSOU, F.  
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*Ann. Gembl.*, 1951, 57: 154-7, bibl. 29.  
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Notes on the life history and habits of the pecan nursery casebearer [*Acrobasis caryovorella*] in Texas. *J. econ. Ent.*, 1951, **44**: 433-4, bibl. 1.
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Neue Beobachtungen über die Wachstums-hemmung der Organe von *Prunus* durch *Anuraphis helichrysi*. (New observations on the growth inhibition of the organs of *Prunus* by *Anuraphis helichrysi*.) *Ber. wissenschaftl. Biol.*, 1949, **66**: 257 [received 1951].
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Comparison of fumigation, contact and stomach actions of benzene hexachloride, D.D.T., chlordan, chlorinated camphene and parathion. *Sci. Bull. S. Afr. Dep. Agric.* **302** (Ent. Ser. **31**), 1950, pp. 12, bibl. 3.
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La "rosetta a foglie saliciformi" del pesco: una nuova malattia da virus. (The "willow-leaf rosette" of peach trees: a new virus disease.) [English summary 12 lines.] *Not. Mal. Piante*, 1951, No. 15, pp. 40-6. See *H.A.*, 21: 3386.
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Transmission of apricot ring pox [a virus] to peaches and plums. *Plant Dis. Repr.*, 1951, **35**: 189, bibl. 3.
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Toxicity of organic insecticides to honey bees: contact spray and field tests. *J. econ. Ent.*, 1951, **44**: 393-7, bibl. 10, being *Tech. Contr. Tex. agric. Exp. Stat.* **1455**.

## WEEDS AND WEED CONTROL.

## General.

419. ADVISORY COMMITTEE ON HERBICIDES FOR ONTARIO.  
Handbook of chemical weed control and 1951 guide to chemical weed control. *Ext. Circ. Ont. Dep. Agric.* **75**, 1951, pp. 21, and **75B**, 1951, folder.

In the handbook information is provided on different herbicides, methods of application, treatments in individual, including horticultural, crops, and suitable spraying equipment.

In the folder are recommendations in tabulated form for selective weed control in field and horticultural crops and for non-selective weed control on roadsides, waste lands, etc. Lists of proprietary preparations containing 2,4-D, 2,4,5-T, mixtures of the two and other active ingredients are given. The most frequently occurring weeds in Ontario are listed and classified according to their susceptibility to 2,4-D, and woody plants according to their susceptibility to 2,4-D, 2,4,5-T and mixtures of the two.

420. HERBICIDES AND WEED CLASSIFICATION COMMITTEE.  
Report of the herbicides and weed classification committee. *Proc. 4th Mig east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 114-21.

Recommendations are made for selective weed control in field and horticultural crops, non-selective weed control on non-arable land and for the use of some newer herbicides. A table giving the common and the scientific names of weeds classified according to their response to 2,4-D is included.

421. SUGGITT, J. W.  
Chemical soil sterilization. *Proc. 4th Mig east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 102-5.

Certain areas such as station yards, parking places, roadways and areas along fences were kept free of all vegetation by application of non-corrosive sterilants. The most promising permanent soil sterilants appeared to be creosote at 2 to 5 gal. per 100 sq. ft., and paris

green at 6 lb. per 100 sq. ft. Temporary treatments which were effective for only one growing season included ammonium sulphamate, sodium chlorate, sodium trichloroacetate and a mixture of sodium chlorate and sodium pentaborate.

### Poisonous plants.

422. WEST, E., AND EMMEL, M. W.  
Some poisonous plants in Florida.  
*Bull. Fla agric. Exp. Stat.* 468, 1950, pp. 47, illus.

Of the economic plants tung (*Aleurites fordii*), shy croton (*Crotalaria spectabilis*), castor bean (*Ricinus communis*), and sorghum (*Sorghum vulgare*) are poisonous to grazing animals.

### Particular weeds.

(See also 453e.)

423. BRAGG, K. K.  
An introduction to the aquatic weed problem.  
*Proc. 4th Mig East. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 106-11, bibl. 7.

Literature on aquatic weed control is reviewed under the following headings: A. Emergent aquatic weeds: (1) Mechanical control such as cutting, dredging, draining, burning and the use of chains; (2) chemical control with 2,4-D, contact herbicides and benoclor. B. Submerged aquatic weeds: (1) Mechanical methods as for emergent weeds; (2) chemicals—fertilizers, sodium arsenite, aromatic solvents, benoclor, 2,4-D and copper sulphate. C. Floating aquatic weeds: Copper sulphate.

424. TIMMONS, F. L., AND BRUNS, V. F.  
Frequency and depth of shoot-cutting in eradication of certain creeping perennial weeds.  
*Agron. J.*, 1951, 43: 371-5, bibl. 15, being *Contr. Fort Hays Branch Kans. agric. Exp. Stat.* 66.

The weeds investigated at various locations in Kansas were field bindweed (*Convolvulus arvensis*), white top (*Lepidium draba*), Russian knapweed (*Centaurea repens*), dogbane (*Apocynum cannabinum*), Johnson grass (*Sorghum halepense*) and climbing milkweed (*Ampelamus albidus*). The longest intervals between shallow hoeings, which were effective in eradicating the various weeds, were 2 weeks for bindweed, 3 weeks for Russian knapweed, and 4 weeks for white top and dogbane. The longest effective intervals between duckfoot cultivations, from 3 to 5 in. deep, were about 3 weeks for bindweed and 4 weeks for Johnson grass. The longer effective intervals of shoot-cutting usually required somewhat longer time to complete eradication than did shorter intervals, though they needed fewer operations. With all weeds, the most economical interval tended to be slightly shorter than the longest effective one. Greater depth of shoot-cutting lengthened the effective interval between cultivations and in most cases reduced the number of operations necessary to eradicate bindweed, Russian knapweed and dogbane. There was, however, no practical advantage in cultivating deeper than 3 to 4 in.

425. WILLIAMS, J. R.  
The control of the black sage in Mauritius by *Schematiza cordiae* Barb. (Col., Gale-  
rucid.).  
*Bull. ent. res.*, 1951, 42: 455-63, bibl. 13, illus.

Black sage, *Cordia macrostachya*, introduced into Mauritius about 1890, became a serious weed, especially of grassland and of aloe, *Furcraea gigantea*, growing areas. Biological control by two leaf-eating beetles which feed, among other insects, upon *Cordia* in Trinidad was tried. After an unsuccessful attempt with *Physonota alutacea*, the second species, *Schematiza cordiae*, was introduced in 1948, and by the middle of 1950 this had either stripped or severely defoliated nearly all black sage on the island. As a result, much scrub is dead owing to a prolonged period without foliage, much is being subjugated by other vegetation, while partial defoliation and direct inflorescence attack have reduced the reproduction of other bushes.

426. CAYOUEITE, R.  
*Euphorbia esula* L. dans le Québec.  
(*Euphorbia esula* in Quebec.)  
*Rev. d'Oka*, 1951, 25: 36-8.

Leafy spurge, *Euphorbia esula*, has been reported as a weed from 3 localities in the province of Quebec recently. Methods of control that have been found effective in trials in Western Canada are summarized. These include fallowing, spraying with sodium chlorate, Atlacide and selective herbicides, and legislation.

427. NICHOLSON, A. J.  
Progress in the control of *Hypericum* by insects.  
*Reprint, 8th internat. Congr. Ent.*, 1950, pp. 4, bibl. 7.

This is an account of promising results in the control of St. John's wort, *Hypericum perforatum*, by the Chrysomelid beetles, *Chrysomela gemellata* and *C. hyperici*. These beetles have shown very impressive ability to clear areas of St. John's wort and to keep them free for several years at least.

428. HODGES, E. M., AND JONES, D. W.  
Torpedo grass.  
*Circ. Fla agric. Exp. Stat.* S-14, 1950, pp. 4, bibl. 2.

Torpedo grass, *Panicum repens*, is a serious weed when established on farm and citrus soils in Florida, but provides useful pastures in less fertile areas. Prevention of spread is the only control measure suggested.

### Weed control in tropical crops.

429. S[UÁREZ] DE C[ASTRO], F.  
Conservación de suelos. (Soil conservation [in coffee plantations].)  
*Bol. inf. Colombia*, 1951, 2: 17: 17-20.

Experiments have shown that coffee yields are greater and erosion losses less where weeds are controlled by cutting than where hoeing is practised. There are, however, several practical objections to cutting. It is suggested that the problem could be overcome by establishing a cover of beneficial weeds and eradicating

only the harmful ones, i.e. climbing weeds and all grasses except *Pseudochinolaena polystachia*. This can be done by maintaining adequate shade which discourages growth of grasses, by hand weeding where beneficial weeds predominate, and by strip weeding where harmful weeds predominate. In strip weeding strips 9 m. wide are alternately hoed and cut. Good cover weeds can then be established on the hoed strips. A patch round each coffee tree must be kept clean cultivated.

## 430. ANON.

**Rubber planting in lalang. Techniques old and new.**

*Planter, Kuala Lumpur*, 1950, 26: 485-7, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 118.

Practical experiences in growing rubber in the lalang grass areas are described, and methods and costs of lalang control are considered.

## 431. VALLANCE, L. G.

**Pre-emergence and post-emergence control of weeds by chemical sprays.**

*Proc. Qd Soc. Sugar Cane Tech.*, 1951, 18: 21-5, bibl. 1, illus.

Work on the use of herbicides to control weeds in sugar cane in Queensland is reviewed. Given proper timing of applications good results have been obtained, both from pre-emergence and contact sprays, either alone or applied successively. In one area the cost of chemical control was £5 9s. 4d. per acre compared with £10 9s. 6d. for conventional methods. Spraying is liable to be less effective on soils that tend to crack, but in these cases control can be obtained by spraying the cane rows only and cultivating the interspaces. Experience suggests that for pre-emergence control a suitable spray is 4 lb. sodium salt of 2,4-D (80% active ingredient) in 20-40 gal. water per acre, and for contact spraying 4 gal. per acre of a concentrate mixture made up of 3-12% pentachlorophenol in 70-80% creosote or mineral oil plus 3-5% ethyl ester of 2,4-D, the 4 gal. being dissolved in 20-40 gal. water.

## 432. HUYSMANS, C. P., AND GONGGRIP, J.

**Chemische onkruidbestrijding in thee. (Chemical weed control in tea.)**

*Bergcultures*, 1951, 20: 209-13.

The following herbicides were tested in a tea garden in Indonesia where *Eupatorium pallescens* was an especially troublesome weed: (1) Weed-no-more (an ester of 2,4-D) at 2.8 or 5.6 l. in 140 l. water per ha.; (2) Weed-no-more at 2.8 l. in 112 l. mineral oil per ha.; (3) DNC at 5.6 kg. in 112 l. oil per ha.; and (4) 2.8 l. Weed-no-more+5.6 kg. DNC in 112 l. oil per ha. The higher concentration of Weed-no-more in water gave satisfactory control of *Eupatorium* and other broad-leaved weeds, checked the growth of most grasses but had no effect on lalang grass. Weed-no-more in oil gave some control of the grasses but unsatisfactory control of broad-leaved weeds. DNC in oil did not give complete control of any species. The mixed application controlled *Eupatorium* and broad-leaved weeds, severely damaged and checked the growth of grasses and caused slight leaf damage to lalang grass. The tea was not damaged.

**Weed control in vegetables.**

## 433. HOLZ, W.

**Versuche mit 2,4-D zur Unkrautbekämpfung im Gemüsebau. (Trials with 2,4-D for weed control in vegetables.)**

Reprinted from *Schädlingsbekämpfung*, 1950, Vol. 42, No. 3, pp. 4, bibl. 12.

Carrot, onion and pea seed sown immediately after the application to the soil of U46, a proprietary 2,4-D preparation, at concentrations varying from 0.2 to 6.0%, did not germinate. Not until 13 mm. rain had fallen did seed germinate 100% in the 0.2% treated plots. Heavier rain made germination possible in plots receiving higher concentrations, and 60 to 70 mm. precipitation leached 2,4-D out of the soil sufficiently for seed to germinate normally even in plots sprayed with 6% U46. While the weed control obtained was considered on the whole good, the commercial use of U46 is not recommended.

## 434. DeFRANCE, J. A., AND SIMMONS, J. A.

**Inhibiting weeds in seedbeds with chemicals.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 355-60, bibl. 4.

Nine chemicals were used, at various rates of application, as weed inhibitors applied before the sowing of maize, spinach, radishes, alfalfa and two grasses in seedbeds. The results indicated that with most crops it was desirable to wait 4 weeks after treatment before sowing. Cyanamid at 75 lb. per 1,000 sq. ft.,  $\frac{1}{4}$  lb. 2,4-D, 4 lb. ammonium thiocyanate and PMAS at 1: 100 or 1: 200 gave excellent control. TCA inhibited all grasses and weeds except purslane. Differences from mechanical treatments were not significant. Cyanate, Sinox-W, IPC and Santo Brite did not inhibit weeds satisfactorily at the rates used. C.W.S.H.

## 435. JASMIN, J. J., FERGUSON, W., AND LYALL, L. H.

**Some results with oils of differing aromatic content and other weed control chemicals.**

*Proc. 4th Mtg east. Sect. nat. Weed Ctee.*, Ottawa, 1950, issued 1951, pp. 46-50, being *Contr. Div. Hort. exp. Fms Serv., Ottawa*, 743.

Out of 4 Stoddard Solvent type oils, one, containing 6% aromatics and 94% naphthenes, gave the most effective weed control in carrots together with the highest crop yield. Of 3 other oils, identified as QXS-16, QXS-16A and QXS-16B, used in peas and beans, QXS-16B, which had the highest aromatic content, gave the best results; weed control in beans was more satisfactory than in peas. QXS-16 was also applied to plots sown with lettuce, spinach, onion, carrots and sweet corn with varying results. Cyanamid applied at 5 different rates to canning peas gave good weed control but with the exception of the 120 lb. per acre treatment it caused yield depression as compared with the control. A cultivated plot gave the highest yield of canning corn, followed by a 4 oz. per acre 2,4-D application.

## 436. ANON.

**Weed control in carrots.**

*Tasm. J. Agric.*, 1951, 22: 239.

In carrots there was practically no difference between



power kerosene and specific petroleum for weed control. In parsnips there was less scorching of the plants by the specific petroleum spirit than by power kerosene; generally there was a good kill of weeds, though older weeds suffered a severe check only and recovered later.

437. CARTIER, R. D., AND DION, A.

Tests with newer herbicides for the control of weeds in onions.

*Proc. 4th Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 40-5.

Isopropyl xanthate applied pre-emergence showed itself superior to two other chemicals used.

438. ROBERTS, H. A., AND WOODFORD, E. K.

DNBP for the control of weeds in peas.

*Agriculture, Lond.*, 1951, 58: 268-73.

Experiments at Oxford since 1946 show that, although DNBP (2:4 dinitro-6-secondary butylphenol) is probably the most satisfactory selective herbicide for peas known at present despite its staining and poisonous properties, considerable care is necessary in its application, since some varieties of pea are particularly susceptible to it. Its value is proved, but further work is necessary.

439. CHIASSON, T. C.

Chemical weed control in potatoes.

*Proc. 4th Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 12-20.

Evidence is presented indicating that 2,4-D is not a safe herbicide for post-emergence treatment of potatoes. In trials conducted at Fredericton N.B. dinitros appeared very promising, though no definite recommendations are yet made.

440. BRAGG, K. K.

The effect of 2,4-D on the morphology and yield of potatoes.

*Proc. 4th Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 91-7, bibl. 3.

Plots planted with Katahdin, Cobbler and Canus varieties in 1948 and 1949 were kept free of weeds by mechanical means in order not to introduce an additional factor into experiments affecting the growth and yield of crop plants. Triethanolamine salt of 2,4-D was used at the rate of 1.2 lb. per acre acid equivalent, applied with a knapsack sprayer at 3 different times so that the effect of treatments carried out both before and after maximum flowering could be observed. The least foliage injury was obtained from the latest application in the season. Foliage injury, however, appeared to bear no relationship to yield returns, as was seen on Katahdin plants, which in 1949 suffered the greatest injury from 2,4-D, yet delivered the heaviest crop. While differences were not statistically significant, reductions in mean yield due to 2,4-D treatment indicated that the Cobbler variety was the most susceptible, Canus intermediate, and Katahdin the most resistant.—Div. Bot. and Plant Path., Sci. Serv., Ottawa.

441. RUZINOV, P. G., AND OHOVA, E. P.

Control of broomrape on vegetables in Moldavia. [Russian.]

*Sad i Ogorod*, 1951, No. 7, pp. 65-7.

Three species of *Orobancha* are known to attack

vegetables, mainly cabbage and tomatoes, in Moldavia. Recommended control measures are: Crop rotation which includes either rice, lucerne, or grasses; adequate supply of fertilizers, particularly nitrogen; destruction of stumps and stems of affected plants after harvest; and subsoiling once in 10 years, i.e. once during a long-term rotation.

*Weed control in vines.*

442. SHAULIS, N., AND DUGAN, D. R.

Chemical weed control in the vineyard.

*Ext. Bull. Cornell agric. Exp. Stat.* 816, 1951, pp. 7, illus.

Growers in New York are advised to make 2-3 applications a year of an emulsion containing 10-15 gal. of aromatic oil, 2 pints of dinitro secondary butyl phenol (55%) and water to make 100 gal. [For more detailed report, see *H.A.*, 21: 2566.]

*Control of trees and shrubs.*

443. SUGGITT, J. W.

Chemical control of dormant brush.

*Proc. 4th Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 53-4.

The Hydro Electric Power Commission of Ontario reports that mature, standing maple, hickory, hawthorn and oak trees, in addition to the more susceptible species, were killed by gashing the lower bark and treating the cut with a full-strength mixture of equal parts of 2,4-D and 2,4,5-T.

*Herbicides and equipment.*

(See also 411, 417s, 453b, c, f, g.)

444. HELSON, V. A., AND MINSHALL, W. H.

Further effects of herbicidal oils on the physiology of plants.\*

*Proc. 3rd Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, pp. 19-20.

A non-phytotoxic oil (boiling range 400-500° F.) applied to parsnip and mustard caused temporary reduction of photosynthesis and transpiration of both plants. When tetrahydronaphthalene (tetralin), an unsaturated aromatic hydrocarbon, was added to the non-phytotoxic oil to give a 15% aromatic content, the mixture caused physiological effects similar to those obtained with a petroleum naphtha [see *H.A.*, 20: 780].

445. HELSON, V. A., AND MINSHALL, W. H.

Further information concerning the use of herbicidal oils on the physiology of certain plants.

*Proc. 4th Mtg east. Sect. nat. Weed Cttee*, Ottawa, 1950, issued 1951, pp. 100-1.

Experiments investigating the effect of petroleum naphtha on the water relations of tomato leaves have shown that the oil applied to lateral leaflets prevented water from reaching the untreated terminal leaflet and that the oil on the third leaf had cut off the water supply to the fourth leaf. To determine the importance of aromatics in petroleum naphtha, a sample of varsol with the aromatics removed was applied to mustard and parsnip. The results obtained were identical with

\* Previously omitted in error.

those observed for a petroleum naphtha containing 15% aromatics [see *H.A.*, 20: 780], and suggest that some non-aromatic constituent in varsol may play a part in the selective action of the oil. Aromatic concentrations, however, also play an important part in selective herbicidal action as seen from the increased reduction of photosynthesis of tomato leaves as the result of increasing concentrations of aromatics in the oil applied.

446. DALLYN, S. L., AND SWEET, R. D.  
**Theories on the herbicidal action of petroleum hydrocarbons.**  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57:  
347-54, bibl. 12, illus.

Petroleum products, such as Stoddard Solvent, are now widely used for weeding carrots. An investigation was carried out to determine the reasons why carrots were unaffected, and other plants affected, by these oils. Anatomical studies were made of the leaves of sprayed plants. Stoddard Solvent penetrated the cells of beans and caused a breakdown of the protoplasm. Carrot cells were only slightly distorted. The effect of these oils on the chlorophyll and stomata of various plants was also studied. It is considered that tolerance is due to differences in cell permeability to the petroleum hydrocarbons. All gradations of tolerance exist, and it appears that the cytoplasmic membranes of Umbelliferae are much less permeable than those of susceptible plants [noted previously, *H.A.*, 21: 3559]. C.W.S.H.

447. CURRIER, H. B.  
**Herbicidal properties of benzene and certain methyl derivatives.**  
*Hilgardia*, 1951, 20: 383-406, bibl. 46.

Test plants carrots, tomatoes and barley, carrots showing the greatest resistance to toxic fumes.

448. ALLEN, S. E., AND SKOOG, F.  
**Phytotoxicity of imidazoline derivatives and related compounds.**  
*Plant Physiol.*, 1951, 26: 611-24, bibl. 11.

A study was made of the phytotoxic effects and the relationship between chemical structure and activity of imidazoline derivatives and some related compounds. All compounds were tested first for their effects on germinating seeds of wheat and radish. Compounds which proved toxic in these tests were further tested on larger plants, including tomatoes, in the greenhouse, spray and soil applications being made. The most toxic imidazoline derivatives applied as sprays to young tomato plants were lethal in concentrations of 0.05%. The compounds were inactivated by contact with the soil. 1-isopropyl-2-nonyl-4,4-dimethyl-2-imidazoline, which was highly toxic in all these tests, was used in respiration experiments and found to be an effective respiration inhibitor. The toxic materials were poorly translocated through plant tissues. To determine the value of the most toxic of these compounds as herbicides the relative susceptibility of 9 plant species to 0.03-1.0% concentrations was determined in the greenhouse. Maize, wheat and lambs quarter proved relatively resistant, soya beans, garden beet, peas and redroot pigweed were moderately sensitive and tomatoes and wild mustard were readily killed by low concentrations. Limited field tests suggest that imidazoline derivatives may be of practical use for contact killing of plants,

particularly seedling weeds before the emergence of crop plants.—Univ. Wisconsin.

449. PALFREY, G. D., AND ROLAND, A. E.  
**Chemical weed control experiments in Nova Scotia, 1950.**  
*Proc. 4th Mig east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 35-9.

In pre-emergence control trials in peas, cyanamid gave consistently the best results under varying conditions of moisture and weed and crop germination. In control of ragwort 2,4-D was much more effective than 2,4,5-T. Against red maple 3 summer sprays of 2,4,5-T were better than similar applications of 2,4-D, and the propylene glycol butyl ether ester of both materials was proved more effective than any of the other formulations used. Dandelions, buttercups, pigweed, Jerusalem artichoke, ragweed and conifer seedlings were also treated.

450. FINN, T. P.  
**Chemical weed killer.**  
*Agric. Chemls*, 1951, 6: 9: 53, 55, 93, 95, 97,  
illus.

The proprietary preparation "Crag Herbicide 1", sodium 2,4-dichlorophenoxyethyl sulphate, is described as a germinative seed toxicant. At the suggested dosage of 2 to 3 lb. per acre for mineral soils or 5 to 6 lb. for organic soils it kills germinating weed seeds in the soil surface, leaving the deeper root systems of the crop unaffected. To date it has been used commercially for controlling weeds in strawberries, sweet corn, asparagus, sugar cane, onions and gladioli. [For more detailed information, see *H.A.*, 21: 2539.]

451. ANON.  
Um novo monador químico "Fernox-one". (A new world chemical, "Fernox-one".)  
*Gaz. Agric. Mozambique*, 1950, 11: 168-9,  
from abstr. in *Field Crop Abstr.*, 1950,  
Vol. 3, abstr. 1138.

Fernoxone is largely based upon 2,4-D. It is said to be neither poisonous, corrosive, nor inflammable. Recommendations on doses suitable for particular weeds are given. Some crop plants, including tomatoes and French beans, are very susceptible to the herbicide.

452. LINSE, H., AND PRIMOST, E.  
Über die Verwendbarkeit von Holzfässern bei der hormonalen Unkrautbekämpfung. (The use of wooden barrels in chemical weed control.) [English summary  $\frac{1}{2}$  p.]  
*PflSch. Ber. Wien*, 1951, 6: 161-77, bibl. 2,  
illus.

Wooden containers of spray equipment adsorb a certain amount of sodium salt of 2,4-D, which in turn is extracted by any aqueous solution. The effect of these extracts has been tested on susceptible broad-leaved plants and it was found that a 0.1% concentration of 2,4-D can be safely applied from the same wooden container as used for other spraying purposes. Danger, however, may arise if higher concentrations, particularly concentrate herbicidal sprays, are used. Precautionary measures to eliminate this risk are suggested.

## Noted.

453.

- a BARABÉ, R.  
Weed control legislation in Quebec.  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 65-7.
- b COOPER, D. J.  
Wide-jet spray nozzles.  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, p. 62.  
Limitations and care necessary.
- c GARESE, P.  
Herbicidas selectivos. (Selective herbicides.)  
*Idia*, 1951, 4: 42/3: 14-21, bibl. 10, illus.  
A review.
- d HOPKINS, E. S.  
Progress in weed control [in Canada].  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 1-7.
- e LINDSAY, D. R.  
Biology of leafy and cypress spurge with  
notes on their distribution in eastern Canada.  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 68-72, bibl. 7.

- f LINSEY, H.  
Unkrautbekämpfung auf hormonaler Basis.  
(Weed control with hormones.)  
*Bodenkultur*, 1951, 5: 191-222, bibl. 3 pp.,  
illus.  
A review of fundamental principles.
- g MINSHALL, W. H.  
Recent developments on the physiology of  
herbicidal action with 2,4-D and maleic  
hydrazide.  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 112-13.
- h MURPHY, K. S.  
Ontario weed control act 1950.  
*Proc. 4th Mtg east. Sect. nat. Weed Cttee*,  
Ottawa, 1950, issued 1951, pp. 63-4.
- i POLETAEF, N.  
Progrès récents dans la lutte chimique  
contre les mauvaises herbes. (Recent  
advances in chemical weed control.)  
*Commun. Soc. Agric. Tunis*, 1950, pp. 10,  
bibl. 22.

## VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

## General.

(See also 55, 56, 57, 60, 68, 935, 1050, 1066, 1083, 1085,  
1104, 1112, 1115, 1116, 1119, 1120, 1121.)

454. KNOTT, J. E., AND LORENZ, O. A.  
Vegetable production.  
Reprinted from *Advances Agron.*, 1950, 2:  
113-55, bibl. 170.

Some of the major advances in agricultural research that have affected vegetable production are reviewed and discussed. These include the use of liquid and gaseous fertilizers, nitrogen sprays and starter solutions; the development of new vegetable varieties with specific adaptations or resistance to disease; the exploitation of heterosis with many crops; practices to improve fruit set; the use of hormones to inhibit growth; the development of labour-saving devices and techniques such as direct field seeding of celery and tomatoes, and the use of pelleted seed, precision planters, chemical herbicides and harvesting machinery.

455. READ, F. M.  
Contributions of agricultural research in  
crops.—4. Vegetables.  
*J. Aust. Inst. agric. Sci.*, 1951, 17: 83-4.

Australian vegetable production has, in the last 50 years, largely passed from the hands of Chinese growers into the hands of Australians who cultivate mechanically. Seeds have been imported from abroad and selection has then been carried out to produce locally suitable strains. Breeding has started in recent years, notably with French beans, tomatoes and cucurbits. Seed certification schemes have been introduced. Lack of animal organic manures has led to the laying down of long-range rotation systems, and to the use of composts and fertilizers. Deficiency disorders have, however, been common. Considerable work with hormone weedkillers and power kerosene has recently

been undertaken and pre-emergence sprays are likely to be valuable. Hot water seed treatment and seed dusting have been introduced for protection against seed-borne disease. C.W.S.H.

456. AGUILA, G. R.  
Indicaciones sobre el cultivo de las hortalizas. (Pointers for vegetable culture [in El Salvador].)  
*Circ. agric. Minist. Agric. El Salvador* 24,  
1950, pp. 16.

General recommendations are made on cultivation practices for vegetables, based on trials carried out at the National Centre for Agronomy, El Salvador, and tables are given summarizing the most suitable crops, varieties, methods of sowing, dates of harvesting, etc., for districts at low, medium and high altitudes.

457. BOYES, D.  
Plant breeding report.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne*  
1950, 1951, pp. 11-13.

Notes are given on the different varieties distributed and not distributed of brussels sprouts, cauliflowers, onions and cabbage and of work done in 1949/50 on the production of nucleus stock seed.

458. D.S.I.R. N. ZEALAND.  
Crop Research Division, Lincoln, Guide  
1950-51.  
Wellington, N.Z., 1951, pp. 28.

This division is responsible for improvement in all field and vegetable crops in New Zealand. As regards vegetables work is in progress on peas, cauliflowers and savoy, carrots, tomatoes, onions. In conjunction with the Cawthron Institute at Nelson it is breeding hops, the main problem there being the prevalence of the black root-rot disease caused by a *Phytophthora*



species to which Californian, the standard variety, is susceptible.

459. HOFFMAN, J. C.

Adaptability of vegetable varieties to the Everglades and adjacent areas.  
*Circ. Fla agric. Exp. Stat. S-7*, 1949, pp. 15 [received 1951].

The results of replicated tests of vegetable varieties and hybrids conducted in the Everglades area of Florida during the period 1947-49 are reported. Green snap beans, wax snap beans, lima beans, cabbage, celery, cucumbers, endive, lettuce, potatoes, squash and sweet corn were included in the trials.

460. LAMM, R., TOMETORP, G., and ÅVALL, H. Klassificerande sort- och stamförsök med köksväxter 1947-1950. (Vegetable variety trials in Sweden 1947-50.) [English summary 4 pp.]  
*Medd. Trädgårdsförs. Malmö* 65, 1951, pp. 63, bibl. 14, illus.

A description of new vegetable varieties and strains tested at Alnarp and adjudged "first-class elite" or "first-class".

461. MACKAY, J. W.

Seed production in Canada.

*Seed World*, 1951, 69: 3: 20, 22.

A brief review of the industry with special reference to British Columbia, which is Canada's most important vegetable and flower seed producing area, and Alberta, renowned for her cereals.

462. SARALEGUI, W. H.

Estudios sobre germinación de semillas de hortalizas, como base para un nuevo padrón de importación. (The vegetable seed germination studies on which the new import regulations [of Uruguay] are based.)  
*Rev. Asoc. Ingen. agron. Montevideo*, 1950, 21: 89: 10-45.

Statistical analyses are presented of seed germination trials with 29 vegetable crops carried out at the Seed Laboratory, Dirección de Agronomía, Uruguay. The new seed import regulations, which are based on these trials, are quoted, and the percentage germination required for various crops under the new and old regulations are compared in tables.

463. PLAUT, M., and GABRIELIT-GELMOND, C. Determination of the viability of seeds of some vegetable and field crops by means of sodium selenite.

*Proc. int. Seed Test. Ass.*, 1949, 14: 190-211, from abstr. in *Field Crop Abstr.*, 1950, Vol. 3, abstr. 47.

The potential value of staining by sodium selenite and other reagents in determining the viability of seeds is discussed. Plants so far found to respond to treatment with salts of selenium, tellurium, or with 2,3,5-triphenyl-tetrazololium chloride are tabulated.—Agric. Res. Stat. Rehovot, Israel.

464. NAUNDORF, G., and SERRANO, C.

Un nuevo tratamiento de las semillas para aumentar las cosechas. (A new seed treatment to increase crop yields.)  
*Agric. trop. Bogotá*, 1950, 6: 11: 9-17, illus.

Work on the treatment of seeds with growth substances has been carried out at the Palmira Agricultural Experimental Station since 1936. It was found that the beneficial effect of growth substances on rooting and seedling growth was increased by the addition of concentrated nutrient salts, minor elements and vitamins. It was also found that the inhibiting effect of seed disinfectants on germination and seedling growth was counteracted by the use of hormones. These results led to the development of complex materials containing the heavy metal salts of growth substances (in particular the copper salt of alpha naphthaleneacetic acid), nutrient salts and minor elements. Seed treatments with these preparations have resulted in yield increases of up to 50% in many vegetable crops and cereals. They do not give good results with potatoes. A fuller, scientific account of the work is to be published elsewhere.

465. SMITH, W. P. C.

Vegetable seed treatments.

*J. Agric. W. Aust.*, 1951, 28: 26-31, illus.

This paper includes a table listing a number of vegetables, the diseases against which seed treatment is desirable, and the treatment in each case. Notes are given on the hot water treatment, the use of corrosive sublimate, formalin, tetroc (spergon), organic mercury dusts and dips, zinc oxide, and copper dusts.

466. NETTLES, V. F.

Effect of soil fumigants on yield and quality of vegetables.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 80.

Two fumigants, D-D and Dowfume W-40, were applied to tomato soils. The treatments were made 10 and 28 days before planting and at the same time 3 fertilizers with different nitrogen sources were tested. Leaf-rolling was not severe, and no significant differences in yield of marketable tomatoes were obtained with fumigation or time of application treatments. Plots fertilized with a commercial mixture out-yielded those receiving fertilizers containing large percentages of ammoniacal or nitrate nitrogen. In further trials with the two fumigants applied at time of sowing and 2, 8 and 14 days before sowing of pea, snap bean, cucumber and okra seeds, there was no significant difference in percentage of germination as the result of either type of fumigant or time of application.

467. JANES, B. E.

Vegetable rotation studies in Connecticut. II.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 252-8, bibl. 7, illus.

This is an interim report on a rotation experiment in Connecticut designed to run for 3 cycles: a total of 12 years. In four rotations 2 crops per year were planted; in another four rotations 2 crops were taken every other year. The best crops of beets and cabbage, grown in that order in the second year, were obtained after crops of sweet corn and vetch in the previous year. In contrast, the worst crops of onions and lettuce were those following sweet corn and vetch, and this was believed to be due to toxic material in the soil from the vetch plants.

C.W.S.H.

468. BURGIS, D. S., AND SPENCER, E. L.  
Use of aluminium foil as a mulch.  
*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 135.  
With broccoli, yields were increased 45%. A 315% yield increase with onions was related directly to the conservation of fertilizer. Strawberries mulched with the foil gave a 32% yield increase; the mulched plots produced earlier and larger carrots.
469. REITH, J. W. S.  
Factors affecting the methods of applying fertilizers.  
*Scot. Agric.*, 1951, 31: 104-9, bibl. 1.  
A discussion on the effects of N, P, K and trace elements on germination and growth, and the influence of climate, soil and crops on fertilizer application. The most suitable methods of application, based on experimental results to date, are enumerated for field crops including potatoes, peas and beans.
470. RICHTER, K.  
Untersuchungen über die gärtnerische Verwertbarkeit von Müll, Klärschlamm, Fäkalien und Mischungen. (*Horticultural use of town refuse, sludge, night soil and mixtures thereof.*) [English and French summaries 4 lines.]  
*Mitt. Klosterneuburg*, 1951, 1: 159-65.  
Field trials conducted over 4 years have shown that yield increases in potatoes, cabbage, spinach, lettuce and other crops due to the various refuse applications were about equal to and in some cases higher than those obtained from farmyard manure applications.
471. WOODMAN, R. M.  
Summary of sand-culture experiments with vegetables.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne*, 1950, 1951, pp. 47-51, bibl. 20.  
The trials were started at Cambridge in 1934 and the following vegetables formed the material: lettuce, turnip, spring cabbage, spinach, carrot, onion, radish, pea, cauliflower. They were submitted to varying amounts of N, P and K and the observations made on resulting growth are here recorded.
472. WILSON, R. D.  
Molybdenum deficiency in plants.  
*Agric. Gaz. N.S.W.*, 1951, 62: 241-5, illus.  
An account is given of the effect of molybdenum deficiency in plants, with particular reference to forage plants and vegetables. The symptoms are most likely to occur on acid soils having a pH of 5.5 or less. Molybdenum deficiency is unlikely to occur when farmyard manure is used. In most soils the deficiency may be prevented by applications of lime or dolomite to reduce acidity and so render available any molybdenum in the soil. A quicker effect can be got by using a molybdenum compound. For vegetable crops 1 lb. of ammonium molybdate, 1½ lb. of pure sodium molybdate, or 3 lb. crude (43%) sodium molybdate per acre can be mixed with fertilizer.
473. CHRISTIE, J. R., PERRY, V. G., AND WILSON, J. W.  
Control of nematodes injurious to vegetable crops.  
*A.R. Fla agric. Exp. Stat. for 1949-50*, 1951, pp. 144-5.  
*Trichodorus primitivus* was found to attack almost all vegetables grown at the Central Florida Station, and is apparently responsible for the "red root" of celery and the stubby, stunted roots of sweet corn. This nematode is more easily killed by chemicals and by drying than most nematodes, but it also builds up in the soil more rapidly than other nematodes. In seedbed trials it was effectively controlled by methyl bromide-ethylene dibromide mixtures.
474. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.  
The vegetable weevil (*Listroderes costirostris*).  
*Agric. Gaz. N.S.W.*, 1951, 62: 251-2, illus.  
This weevil is particularly destructive in New South Wales to carrots, turnips, beetroot, lettuce, radishes and potatoes. Clean cultivation is an important factor in its control. All weeds should be destroyed early in the winter and the ground then kept free of weeds until sowing time. As a precautionary measure, before planting out, the soil should be baited with chopped leaves which have been sprayed or dusted with arsenate of lead or DDT. The formula for a poisoned bran mash is given and also one for a poisoned pollard bait.
475. BLUNCK, H., AND MAERCKS, H.  
Lebensweise und Bekämpfung der Drahtwürmer. (*Biology and control of wireworms.*)  
*Flugbl. biol. Bundesanst. Braunschweig C6*, 1951, pp. 5, illus.  
Good control of wireworms can be obtained with BHC preparations. While the new pure or  $\gamma$ -BHC does not impart so strong an off-flavour to the crop as the earlier preparations did, it is still recommended that potatoes should not be planted within 12 months of its application. Biological control by insectivorous wild birds (starlings, crows, pheasants, plovers, seagulls) and domestic poultry should be encouraged.
476. SAALTINK, G. J.  
Bestrijding van ritnaalden door behandeling van het zaaizaad. (*Control of wireworms by seed treatment.*)  
*Nieuwe Veldbode*, 1951, No. 23, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 632-3.  
Experiments in the control of wireworms have shown that drilling HCH with the seed has certain advantages over applying it broadcast. Less material is used and consequently the cost is lower and tainting is reduced to a minimum. The kill of wireworms, however, is also lower, as the insecticide acts only as a protectant. The amount of HCH used must be carefully regulated to avoid damage to the seed.
477. WEIGEL, C. A., FOSTER, A. C., AND CARTER, R. H.  
Effect on truck crops of DDT applied to the foliage.  
*Tech. Bull. U.S. Dep. Agric.* 1034, 1951, pp. 20, bibl. 9.  
An account of trials made at Beltsville from 1945 to 1948 on 11 kinds of vegetable. One or more experiments were run on each crop. Each experiment was replicated in 8 randomized blocks and each plot was 35 ft. long and had 3 to 8 rows. DDT was found to stunt the growth of Early Yellow Crookneck Squash

and reduce its yield. It caused temporary foliage injury without affecting yield in some tomato, potato and bean varieties, but on most of the beans, onions, beets, cabbages, cantaloupes, cucumbers, peas, squashes potatoes and turnips it had no deleterious effect.

478. ŠAPIRO, I. D.

**The toxic action of hexachloran inside plants on insects.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 481-4, bibl. 3.

Data tabulated show that seeds of turnip, pea and vetch treated with hexachloran give rise to sprouts that are protected to some extent against turnip flea beetle (*Phyllotreta* sp.) and the pea weevil (*Sitones* sp.).

479. ROŽIN, M. B.

**An anti-mould cleanser for fruit, vegetable and potato stores.** [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 9: 39-41, bibl. 7.

It is stated that the usual methods of eliminating moulds from the walls and floors of storage chambers by fumigation, chloride of lime, milk of lime, and iron sulphate have little effect. An anti-mould cleanser, "Antimycose", consisting of kaolin containing a fluorine compound of sodium, iron, or ammonium, is recommended.

480. HARDENBURG, R. E.

**Further studies on moisture losses of vegetables packaged in transparent films and their effect on shelf-life.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 277-84, bibl. 11.

In a comparison of proprietary transparent films for the packaging of 8 vegetables it was found that Pliofilm, MSAT cellophane and VinyLite kept moisture out most effectively but that LSAT cellophane, in allowing some moisture loss, reduced mould and sliminess. Lumarith packaged vegetables showed greater shrinkage, but their life was as long. C.W.S.H.

### *Asparagus.*

(See also 631g, l.)

481. HANNA, G. C.

**Asparagus production in California.**

*Circ. Calif. agric. Ext. Serv.* 91, revised 1950, pp. 20, illus.

The bulletin covers all practical aspects of [white and green] asparagus growing in California, where the average yield per acre is said to be 2,300 lb., some fields producing up to 5,000 lb. or more. The profitable life of a planting is given as 11 years. It is produced chiefly in the Sacramento-San Joaquin, San Fernando and Imperial Valleys.

482. JUNE, R. I.

**Establishing an asparagus field.**

*N.Z. J. Agric.*, 1951, 83: 137-40, illus.

This account of the operations involved concludes with a note on varieties: "In the past the varieties most favoured have been Mary Washington and Connovers Colossal. Paradise, a more recent introduction, has now been grown long enough to prove that its production considerably exceeds that of the older-established varieties. Other varieties have been established, but

their quality and cropping ability cannot yet be compared with those of present varieties."

483. FAUVART, M.

**La culture des asperges. Essais de chauffage électrique. (Asparagus culture. Trials of electrical soil warming.)**

*Rev. hort. Paris*, 1951, 123: 514-17, illus.

In small-scale trials, using electric cables to force old asparagus crowns growing in a shed, it was found possible to make the first cutting in mid-December, 25 days after the application of heat. From 27 to 45 Kwh. electricity were consumed per kilogram of crop.

484. NEPVEU, P., AND BENAS, G.

**La chenille à fourreau de l'asperge (*Hypopta caestrum* Hubner) dans les aspergeraies de Vaucluse. Moyens pour la détruire. (The asparagus moth (*Hypopta caestrum* Hubner) in the asparagus gardens of Vaucluse. Measures for destroying it.)**

*C.R. Acad. Agric. Fr.*, 1951, 37: 134-5.

The methods suggested are (1) the destruction of the cocoons by exposing the surface layers of the soil to full insolation at the end of May or beginning of June, the chrysalids being killed by 3 or 4 days exposure to strong sunshine, or by collecting the cocoons by hand at the time the crop is harvested, (2) the destruction of the eggs by a heavy sprinkling of SNP at the end of June, (3) killing the larvae in autumn by injecting dichloropropane-dichloropropene under the roots. In an article on pp. 132-3 Nepveu describes the damage done by the insect and its habits and life history [see 631 l].

### *Brassicas.*

(See also 631m.)

485. KRUŽILIN, A. S., AND ZAURALOV, O. A.

**The transpiration of heat-resistant varieties of cabbage.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 73: 1295-6.

Heat-resistant forms of cabbage are those with a high rate of transpiration during the day. The early selection of such forms for hot climates hastens breeding work.

486. KRUŽILIN, A. S., ZAURALOV, O. A., AND MIHALEV, A. JA.

**The effect of high temperatures on the oxidizing processes in cabbage, tomato, and potato plants.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 917-20, bibl. 8.

This investigation was carried out on cabbage, tomato and potato plants, some resistant others not resistant to high temperatures. From the results obtained it is concluded that the resistant varieties are adapted to southern, dry, climatic conditions because of protective oxidizing processes which develop with increase in air temperatures. In the non-resistant varieties under those conditions the peroxidase activity is much less.

487. ZAURALOV, O. A., AND KRUŽILIN, A. S.

**Changes in nitrogen metabolism in cabbage leaves at high temperatures.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 733-6, bibl. 10.



Three southern varieties of cabbage, resistant to high temperatures, and one northern, non-resistant variety were compared. The resistant varieties contained less ammoniacal nitrogen but more proteid nitrogen than the non-resistant one. Extracts from all four varieties checked the germination of cabbage seeds, but at high air temperatures there was some varietal difference in the rate of germination, that of the non-resistant variety being low.

488. KRASNIKOV, M. M.

The use of the second crop of early cabbage for seed production. [Russian.]

*Sad i Ogorod*, 1951, No. 7, pp. 59-60, illus.

In Alma-Ata, Khazakhstan, the early cabbage variety Nomer pervyi [Number one] was harvested carefully by cutting the heads off slightly aslant. The stumps received a side dressing of NPK at the rate of 30 kg. active ingredient per ha., were irrigated and generally encouraged to form new heads. The plants were lifted before the first frosts and stored for seed production the following year. Seed obtained from these second crop plants gave 25-31% higher yields than first crop seed.

489. CAMARGO, L. DE S.

Adubação do repólho. Parte I—Experiências preliminares. (Manuring of cabbages. I. Preliminary trials.) [English summary 10 lines.]

*Bragantia*, 1950, 10: 69-77, bibl. 9, illus.

Manurial trials were carried out on 3 varieties of cabbage at the Tupi and Campinas Experiment Stations, Brazil. Farmyard manure, cottonseed meal and superphosphate encouraged early head formation and increased yields. Higher yields in tons per ha. were obtained by an application of 5:13:5 fertilizer at the rate of 1,800 kg. per ha. than by applications of organic manure alone. The best yields, however, were obtained by a combination of organic and inorganic fertilizers, i.e. farmyard manure at 3 kg. per plant or cottonseed meal at 300 g. per plant together with 7:10:8 NPK at 1,260 kg. per ha.

490. WIEBOSCH, W. A., AND OTHERS.

Hartloosheid en klemhart bij bloemkool. (Blindness and whiptail in cauliflower.) [English summaries.]

Reprinted from *Versl. Landbouwk. Onderz.* 56.10, 1950, pp. 53, bibl. 19, illus., as *Publ. Proefst. Groent. Fruit Glas* 26 [English summary  $\frac{3}{4}$  p.] and as *Meded. Inst. Plziekt. Onderz.* 13 [English summary 3 pp.].

As a result of a series of experiments, distinction is made between two forms of blindness in cauliflowers: A. *Common blindness*, in which the plants show a sudden transition from normally developed leaves to an empty heart. This occurs mainly in overwintered plants sown in September, and recovery is not possible except by the development of lateral shoots. B. *Whiptail*, in which the plants form abnormally-shaped leaves, and small, swollen stalk organs develop in the heart. This occurs mainly in January-sown plants and the plants often recover. The two forms sometimes intermix, and both are attributed to a premature ripeness to flower. They are caused by vernalizing influences and/or growth disturbances. Depending on

the time at which it occurs, ripeness to flower may cause blindness, whiptail, bolting or normal heading. Bolting usually occurs in the earliest varieties, blindness in the latest varieties and whiptail in varieties of the medium early Alpha group. These phenomena are promoted by (1) a period of low temperature either in the hot bed or shortly after planting out; (2) a period of drought, especially immediately after planting out; and (3) excessive nitrogen either in the hotbed or immediately after planting out. The effect of other cultural practices was also studied, and it is concluded that any practice which causes a check to growth may cause blindness or whiptail. [See also *H.A.*, 20: 1637-1640.]

491. JENKINSON, J. G., AND JONES, G. D. G.

Control of cauliflower mosaic virus.

*Nature*, 1951, 168: 336-7, bibl. 4.

Results of trials in Devon have shown that while broccoli plants raised either in clean or in infected seedbeds developed virus symptoms before they were cut, those from the isolated, i.e. uninfected, seedbeds gave heavier yields and a higher percentage of marketable heads. In spite of the excellent control of the aphid vector *Brevicoryne brassicae*, obtained by 0.3% bis-(bis-dimethylamino-phosphonous) anhydride spray, virus transmission was not inhibited.

492. EDDINS, A. H., AND TISDALE, W. B.

Cabbage black rot and yellows and their control.

*Circ. Fla agric. Exp. Stat.* S-4, 1949, pp. 12 [received 1951].

Cabbage black rot (*Xanthomonas campestris*), a common and destructive bacterial disease of cabbage and other crucifers in Florida, and yellows (*Fusarium oxysporum* f. *conglutinans*) are described with control recommendations—for black rot: disease-free seed; hot water treatment of seed; rotation of seedbeds and fields; disease-free plants; and for yellows: the use of resistant varieties and yellows-free soil for seedbeds.

493. BAIN, D. C.

Observations on resistance to black rot in cabbage.

*Plant Dis. Repr.*, 1951, 35: 200-4, bibl. 2.

As a result of tests on 80 varieties it was found that there was a perceptible difference in the degree of susceptibility of cabbage seedlings in those varieties to infection by *Phytophthora* (*Xanthomonas*) *campestris*.—Truck Crops Branch Station, Crystal Springs, Mississippi.

494. WAGER, V. A.

The black-rot and black-leg diseases of cabbages.

*Fng S. Afr.*, 1951, 26: 258-60.

Black rot is due to *Bacterium campestre*, black leg to *Phoma lingam*. Points in treatment of both diseases are strict hygiene, which includes the burning of all infected material, not replanting with plants of the cabbage family on infected land for 3 or 4 years, sowing seed sparsely to allow for adequate ventilation, spraying seedlings once a week with bordeaux mixture or copper lime. When in doubt, sterilize seed before planting with mercuric chloride or hot water.

## 495. NATTRASS, R. M.

The "canker" or "black leg" disease of cabbages and cauliflowers.

*E. Afr. agric. J.*, 1951, 16: 178-80, illus.

*Phoma lingam* was introduced into Kenya in seed consignments from abroad, and damage was first noticed in a cabbage crop being grown for seed at 7,700 ft. The disease can be controlled by fungicidal treatment of the seed with mercurial dusts to kill the spores, and by hot water treatment (25 minutes at 122° F.) to kill the mycelium within the seed coat. The seed should then be tested for germination. Diseased seedlings should be picked out and the remainder sprayed 3-4 times with bordeaux mixture.

C.W.S.H.

## 496. MILES, M.

Some aspects of cabbage root fly attack in the field.

*Agriculture, Lond.*, 1951, 58: 234-7, bibl. 7.

*Erioischia brassicae* is a pest of brassica crops over much of North America and northern Europe and Asia. Brassica crops which have been attacked tend to decay and attract scavenging insects, of which *Pegohylemyia fugax* is the most common. The emergence and egg-laying activity of *E. brassicae* were shown, by records from 1948 to 1951, to be associated with high temperature and long periods of sunshine in April or May. Second generation attacks occur in June and July, and second and third generation attacks in September and early October. In rainy weather injury is masked and more plants survive. Plants set out in May-June, between first and second generations, usually escape serious attack.

C.W.S.H.

## 497. MILES, M.

Factors affecting the behaviour and activity of the cabbage root fly (*Erioischia brassicae* Bche).

*Ann. appl. Biol.*, 1951, 38: 425-32, bibl. 8.

The feeding of flies on sugar solutions indicated that nectar is an important factor in the diet of these root flies. The activity of the fly is influenced by weather conditions and its need for food and shelter. The peak egg-laying period is the end of the third week in April when fruit trees and many wild flowers are in bloom. Their emergence is in mid-April, and attack in the field starts in the first sunny period thereafter. Dusting with calomel (mercurous chloride), as an ovicide, can therefore be correctly timed. Eggs are laid on the soil and many parts of the plant, the positions depending on the weather. Cold or wet weather checks feeding and egg-laying and therefore reduces the attack of this pest.

C.W.S.H.

## 498. SEMENOV, A. E.

Effectiveness of applying low concentrations of hexachloran dust in the control of the cabbage fly. [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 10: 35-8, bibl. 8.

Hexachloran for the control of cabbage fly [*Hylemyia brassicae*] must be applied to the ground between the plants, and not dusted on the leaves because of the unpleasant odour it imparts. Cabbage fly can be controlled with a 6% dust at 0.5 g. per plant or 12% at 0.25 g. applied three times.

## 499. COUTIN, R., AND OLART, M.

Observations biologiques sur la cécidomyie du choufleur (*Contarinia nasturtii* Kieff.) dans le marais de Saint-Omer. (Biological observations on the cauliflower gall midge in the market gardens of Saint Omer.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 425-6, bibl. 5.

Severe infestations by the cauliflower midge are reported with notes on its annual cycle. Three generations were observed from June to mid-August in 1950. Spraying with preparations containing nicotine or parathion are mentioned as control measures.

## 500. SMITH, C. E., AND HARRISON, P. K.

Studies of arsenical residues on cauliflower.

*J. econ. Ent.*, 1951, 44: 318-21, bibl. 2.

Insects damaging cauliflowers in the southern United States can be effectively controlled by arsenic dusts, much of which is washed off by rain or otherwise removed. In spite of these losses, plants treated after the start of curd formation, and marketed untrimmed, as is the custom in Louisiana, are unsafe for consumption. It is recommended that just before the last proposed application several of the most advanced plants in the field should be split through the centre to see whether the young curds are forming. Only when these are under 0.5 in. in diameter should the arsenical treatment be used.

## Celery.

(See also 631p.)

## 501. FORSEE, W. T., JR.

The place of soil and tissue testing in evaluating fertility levels under Everglades conditions.

*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 297-9, bibl. 3.

An experiment correlating crop yields of celery grown on Everglades peaty muck soil with the results of soil and tissue tests is described in illustration of the way in which such tests can be used. It is concluded that for maximum celery yields the K level, as determined by the soil test, should be about 250 lb. per acre, and the water-soluble P about 30 lb. per acre. The pH should be adjusted to a value of about 5.5. Where the P and K levels in the soil are optimum, the fresh stem tissue will contain about 0.3% P and 11% K. As a result of this experiment and corroborative data from subsequent experiments, it is now possible to make accurate fertilizer recommendations for celery on the basis of soil tests.

## 502. D'ANGIO, C. J., AND HAYSLIP, N. C.

DDT, parathion and toxaphene residues on celery.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 213.

Celery grown on experimental plots was sprayed weekly at the recommended rates, starting 13 days after planting. The insecticide treatments were discontinued 14 days before harvest, except with DDT; one lot was sprayed up to 7 days before harvest, another up to 28 days. All celery treated with parathion showed a residue of less than 1 p.p.m., toxaphene gave an

average residue of 1 p.p.m. while DDT residues, on plants sprayed up to 28 days before harvest, ranged from 1 to 1.5 p.p.m., and plants treated up to 7 days showed an average of 2.8 p.p.m.

### *Cucurbits.*

(See also 51, 207, 361, 631a, d.)

503. BEATTIE, J. H., AND DOOLITTLE, S. P.  
**Watermelons.**

*Fmrs' Bull. U.S. Dep. Agric.* 1394, revised 1951, pp. 30, bibl. 1, illus.

Watermelons are widely grown commercially in the United States. In 1948, 255,490 acres were planted to this crop in the 23 principal producing states, which include Georgia, Florida, South Carolina, Texas and California. Brief descriptions are given of the best varieties, indicating whether they are suitable for shipping, local marketing or home use, and a detailed account is given of cultivation, harvesting and pest and disease control methods.

504. HOARE, A. H.

### **The melon in England.**

*Agriculture, Lond.*, 1951, 58: 24-7, bibl. 4, illus.

The cultivation of melons in England under glass or in the open under cloches is described and the more satisfactory varieties of netted and cantaloupe melons are mentioned.

505. HYAMS, E.

### **Melons under cloches.**

*Country Life, Lond.*, 1951, 110: 1634-5, illus.

Detailed instructions are given for the growing of self-setting melon varieties such as Tiger, Dutch Net, and Charentais under cloches in the open in southern England.

506. MORRISON, G.

### **Squashes and pumpkins.**

*Seed World*, 1951, 69: 4: 20, 46-7; 6: 12, 44, illus.

The most popular varieties of the three species, *Cucurbita maxima*, *C. pepo* and *C. moschata*, widely grown in the United States, are briefly described.

507. MILLÁN, R.

### **Biología floral en especies de "Cucurbita".**

(Floral biology of *Cucurbita* species.)

*Rev. argent. Agron. B. Aires*, 1951, 18: 176-82, bibl. 14.

A summary is given of information on the flower types found in *Cucurbita* spp., the possibilities of inter- and intra-specific crossing and self-pollination, and methods of artificial pollination.

508. ZINK, F. W., AND DAVIS, G. N.

### **Nitrogen on cantaloupes.**

*Calif. Agric.*, 1951, 5: 6: 9.

Heavy nitrate dressings did not affect mosaic infection or yield, but lighter dressings increased fruit size and reduced culls. The most satisfactory application was 60 lb. N per acre as ammonium nitrate, half applied before planting and half when the runners start to grow. Nitric acid applications were not beneficial. [See also *H.A.*, 21: 2607.]

C.W.S.H.

509. MACGILLIVRAY, J. H.

### **Effect of irrigation on the production of cantaloupes.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 266-72, bibl. 14, illus.

At Davis in California shallow-rooted crops, such as sweet corn, potatoes and onions, have shown big responses to irrigation. The experiment described in this paper showed that, in common with watermelons, cantaloupes, which are also deep rooting, give a smaller response to irrigation. The field used was flooded to field capacity, i.e. so as to be wet to a depth of 6 feet before planting. In two out of three years significant increases in yield were obtained by irrigation. Size of fruit and total solids percentage were not increased. The results indicate that only light irrigation was necessary and the tendency of growers to use an excessive amount of irrigation water is discussed.

C.W.S.H.

510. CRANDALL, B. S., AND PATIÑO, B.

### **Enfermedades de los pepinos, melones y sandias y su control. (Disease of cucumbers, melons and water-melons and their control.)**

*Circ. agric. Minist. Agric. El Salvador* 32, 1951, pp. 3.

Brief notes on anthracnose (*Colletotrichum* spp.), powdery mildew (*Erysiphe cichoracearum*), downy mildew (*Pseudoperonospora cubensis*) and a root rot (*Sclerotium* sp.). Reference is made to trials in the United States with some of the newer fungicides.

511. BHARGAVA, K. S.

### **Some properties of four strains of cucumber mosaic virus.**

*Ann. appl. Biol.*, 1951, 38: 377-88, bibl. 28, illus.

The investigations reported in this paper followed the discovery of cucumber virus in a spinach plant. This was of particular interest, since tobacco plants were protected from invasion by the spinach virus by the presence of three other cucumber viruses. The spinach virus also caused countable local lesions in tobacco. Two strains were isolated from the spinach plant through infested tobacco and *Primula obconica* plants, and were called "spinach strain" and "primula strain" respectively. These, together with two other strains, the "turnip strain" and the "yellow strain", were the subjects of a full investigation to determine their host range, symptoms caused, virulence, transmissibility by aphids, dilution end-point and thermal inactivation point. Seasonal variations in the susceptibility of host plants were found and there were considerable differences in the ease with which the viruses were transmitted from various hosts. Infectivity of cucumber mosaic virus was largely destroyed at temperatures below the thermal inactivation point. *Myzus persicae* is the most efficient vector. C.W.S.H.

512. KLOSTERNEUBURG.

### **Blattschädigungen an Gurken. (Leaf spot of cucumber.)**

*Mitt. Klosterneuburg*, 1951, 3: 121-3, illus.

Two types of symptom seen on plants near Vienna, hitherto undescribed, are discussed and illustrated: (1) an atrophy of tissues in the lower epidermis and the



mesophyll, which makes the leaf margin appear white, (2) an atrophy of tissues on the upper side of the leaf leading to spots along the veins and eventually to perforation of the lamina. The symptoms of the first type were removed by application of liquid chicken manure twice a week. Pathogens can also be ruled out as a possible cause for the trouble underlying the second type of symptoms, which are now being investigated.

513. EDWARDS, G. R.

Insect pests of vegetable crops. VI. Insect pests of pumpkins, melons, and related crops.

*J. Dep. Agric. S. Aust.*, 1951, 54: 448-50, illus.

Descriptions, with notes on control of: the pumpkin beetle (*Ceratia hilaris*), arsenate of lead sprays, and DDT, derris or pyrethrum dusts; green vegetable bug (*Nezara viridula*), pyrethrum powder mixed with equal quantities of 2½% nicotine dust; melon aphid (*Aphis gossypii*), natural predators and parasites, nicotine or HETP sprays; red spider (*Tetranychus urticae*), clean cultivation, sulphur-hydrated lime dust or lime-sulphur spray 1-100.

514. MICHELBACHER, A. E., MIDDLEKAUFF,

W. W., AND GLOVER, L. C.

Studies with aldrin and dieldrin against melon insects.

*J. econ. Ent.*, 1951, 44: 390-3, illus.

In trials in California dieldrin was found more effective than aldrin against the leaf miner, *Liriomyza subpusilla*, and sprays were better than dusts. Both insecticides were satisfactory in controlling *Diabrotica* beetles, darkling ground beetles and the melon leafhopper, *Empoasca abrupta*, though against the latter dieldrin was better than aldrin. Both materials were highly toxic to bees.

515. BESS, H. A., AND NISHIDA, T., Jr.

Border spraying for melon fly control.

*Agric. Ext. Circ. Univ. Hawaii* 312, 1951, pp. 4.

An account of protecting cucumbers, melons and tomatoes from the melon fly by planting a corn [maize] border and spraying the border, which will collect the flies, with DDT or parathion.

516. BANKS, C. J.

Syrphidae (Dipt.) as pests of cucumbers.

*Ent. mon. Mag.*, 1951, No. 140, pp. 239-40, bibl. 1.

A note on a heavy infestation of glasshouse cucumbers at a nursery in Wheathampstead, Herts., by Syrphids, subsequently identified as *Tubifera pertinax*, *T. arbutorum* and *Syrphita pipiens*. The flies were damaging the plants by pollinating the female cucumber flowers, thus making the fruit unmarketable. Squashing proved the quickest means of destruction.

517. LORENZ, O. A.

Summer squash harvest time.

*Calif. Agric.*, 1951, 5: 1: 6, 12, illus.

Fruits between 100 and 300 g. are marketable for table use. A trial was carried out to determine the number of days after flowering during which the four varieties Zucchini, Early Prolific, Summer Crookneck and

White Bush Scallop would be marketable. Zucchini is only marketable between the third and fifth day after flowering, but the other varieties are slow growing. The increases and decreases of reducing sugars, starch and alcohol-insoluble solids during growth were determined. C.W.S.H.

518. LORENZ, O. A.

Chemical changes in Early Prolific summer squash during storage.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 288-94, bibl. 5.

At 32° F. fruit remained marketable for 14-17 days at 50° F. for 14 days, at 60° F. for 8 days and at 70° F. for 6 days. Except at 32° F. there was a considerable conversion of starch to sugar during the first few days of storage. C.W.S.H.

519. WEBSTER, J. E., AND ROMSHE, F. A.

Watermelon sirup; its composition and the composition of juice from which it was made.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 302-4, bibl. 5.

An attempt was made to produce sirup from the juice of watermelons grown for seed production. A dark red sirup was produced and different opinions were expressed as to its taste. Yield was 7.5-11% of the fresh juices, solids percentage was 8-10, sucrose content 20-50% and ash content 2.1-3.3%. Owing to the low yield this sirup would not be able to compete with sorghum or corn sirup. C.W.S.H.

## Legumes.

(See also 19, 32, 43, 46, 47, 50, 631c, k, t, v.)

520. REYNOLDS, J. D.

Pea growing in Holland and Belgium. 2.

Research and advisory work.

*Agriculture, Lond.*, 1951, 58: 223-5.

Research in Holland has shown that phosphorus is essential for satisfactory cooking quality in peas and that the effect of phosphorus is improved by the presence of adequate potash. Dressings applied in the preceding autumn give best results. Varietal work in Belgium is directed to the production, by selection hybridization and introductions, of varieties with medium length, stiff straw and small, round, sweet peas. In Holland varieties are produced by private plant breeding stations which obtain legal protection for their varieties, the latter being inspected and tested by a central organization. The commonest disease are those caused by *Ascochyta* and *Fusarium* species. Experiments have been carried out with American varieties resistant to wilt (*F. oxysporum* f. *pisi* race 1) and near-wilt (*F. oxysporum* f. *pisi* race 2), from which it appears that the Dutch and American strains of near-wilt are distinct. C.W.S.H.

521. LUCHINI, R.

Arvejas para la industria. (Peas for canning.)

*Experimenta*, 1951, 3: 7/9: 60-9, bibl. 5.

Notes on the problems of harvesting and determining the correct stage of maturity for canning peas are followed by an account of a variety trial in South Mendoza with Alaska, Climax, Surprise, and Perfection. The cultural requirements of canning peas are outlined.

522. NILSSON, F., AND LARSSON, G.  
Sortförsök med köksväxter i Norrland.  
VI. Märg- och spritärter 1939-1948. (Variety trials with vegetables in Norrland. VI. Smooth and wrinkled garden peas 1939-1948.) [English summary 1 p.]  
Medd. Trädgårdsförs. Malmö 66, 1951, pp. 47, bibl. 3, illus.

Tall, medium-tall and dwarf shelling peas were included in these trials, as a result of which recommendations for each category are made.

523. HAMILTON, J.  
The experimental production of market and freezer pea varieties on the Yuma Mesa.  
Proc. Amer. Soc. hort. Sci., 1951, 57: 217-24, illus.

On the light soils typical of over 100,000 acres in the Lower Colorado river basin of California and Arizona, experiments have shown that satisfactory crops of peas can be grown provided spring varieties are sown in autumn for spring harvest, the crop is effectively inoculated, and phosphate fertilization is adequate. Field trials showed that Asgrow 40, Rondo and Wando varieties yielded well, and that planting in mid-November gave higher yields than December planting. Twenty irrigations, totalling 12.25 in., were superior to 13 irrigations providing 8.00 in. Placement of phosphate was better than broadcasting and, with placement, 50 lb.  $P_2O_5$  per acre was adequate. A sowing rate of 150 lb./acre gave a higher yield than 75 lb./acre. C.W.S.H.

524. WESTER, R. E., AND JÖRGENSEN, H.  
Hybrid vigor of lima beans.  
Proc. Amer. Soc. hort. Sci., 1951, 57: 305-9, bibl. 8.

Some degree of hybrid vigour was found in the  $F_1$  plants from three out of four lima bean crosses. In the Clark's Bush  $\times$  Triumph cross the  $F_1$  plants were superior to either parent in green plant weight, pod number, seed number and weight of seed per plant. For the production of hybrid seed a high percentage of natural crossing and a distinctive genetic marker in the hybrid seed must be found. High percentage of natural crossing has been found with green seeded Henderson type beans (such as Thorogreen, Clark's Bush and Cangreen) used as the female parent. With Triumph as the male parent the white hybrid seed could be separated by an electric eye sorting machine. C.W.S.H.

525. AIZENŠTAT, R. S.  
The effect of heteropollination on the fecundity and characters of hybrid fruits. [Russian.]  
Doklady Akad. Nauk S.S.S.R., 1951, 77: 1095-8, bibl. 5.

From the results recorded for peas and tomatoes it is concluded that, in inter-varietal crossing with a limited quantity of pollen of the  $\delta$  variety, the addition of pollen from an unrelated plant increases the set and (in tomato) the size of the fruit.

526. LAMBETH, V. N.  
Some factors influencing pod set and yield of the lima bean.  
Res. Bull. Mo. agric. Exp. Stat. 466, 1950, pp. 60, bibl. 94, illus.

Yields of large-seeded lima beans have been inconsistent owing to dropping of buds, flowers and young pods. This might have been due to poor fertilization or to environmental conditions affecting other physiological processes. Experiments showed that poor pod set was due to inadequate ovule fertilization, and a minimum of one fertilized ovule per pod was necessary to prevent abscission. Owing to the sensitive nature of the pollen grain, the microgamete, during adverse weather conditions, often fails to reach the egg while it is receptive. Available soil moisture was found to be the most important factor limiting pod set. Moisture levels exceeding field capacity or approaching the wilting coefficient reduced pod set. Heavy rain, high or low temperature extremes, and excessive nitrogen were also factors of importance in inhibiting pod set. Optimum yield depended on "capacity set" and the metabolic activity of the plant, the latter depending on sunlight duration and the plant's habit of growth. It is suggested that more consistent yields could be obtained by analysing the weather pattern and adapting planting dates and cultural practices to it. C.W.S.H.

527. HUNT, G. E.  
A comparative chromatographic survey of the amino acids in five species of legume roots and nodules.  
Amer. J. Bot., 1951, 38: 452-7, bibl. 15.

The species studied included *Phaseolus vulgaris* var. Michelite and *Pisum sativum* var. Thomas Laxton. The results suggest that compounds similar to valine or the leucines are involved in the normal nitrogen assimilation in the root of the legume.—Cornell Univ., Ithaca, N.Y.

528. BERNSTEIN, L., AND AYERS, A. D.  
Salt tolerance of six varieties of green beans.  
Proc. Amer. Soc. hort. Sci., 1951, 57: 243-8, bibl. 15.

The varieties Giant Stringless Green Pod, Logan, Asgrow Black Valentine, Ranger, Florida Belle, and Tendergreen were grown in control plots and in plots receiving an equal mixture of NaCl and  $CaCl_2$  at 3,000 p.p.m. and at 6,000 p.p.m. The yield of all varieties was reduced by both concentrations. All varieties are considered very sensitive to salinity when compared with other crops. Susceptibility was found to vary in the different varieties. This is discussed. C.W.S.H.

529. SPENCER, K.  
Superphosphate placement for spring peas.  
Internal Rep. Irr. Res. Stat. Griffith 12, 1950, pp. 10 (mimeo.).

The trials were made in a low phosphate area of loam soil near Griffith. The results of drilling the superphosphate a week before sowing were slightly but not generally significantly better than drilling with the seed. Application at different levels, viz. seed level, 2 in. below, 4 in. below, 2 in. to side and 1 in. below seed, was also tested. Although the deeper placements seemed slightly superior, the growth and yield were not greatly affected by differences in placement.

530. OLTSMANN, W.  
Qualitätseigenschaften bei Erbsen. (Quality in peas.)  
Saatgutw., 1950, No. 6, from abstr. in Rev. Agric. Brux., 1950, 3: 1101.

The results of manurial experiments showed that the flavour of peas fertilized with phosphate and potash was better than that of unfertilized peas, while peas fertilized with potash alone had the worst flavour.

531. PETERSON, A. E., AND BERGER, K. C.  
Effect of magnesium on the quality and yield of canning peas.  
*Proc. Soil Sci. Soc. Amer.*, 1950, **15**: 205-8, bibl. 10.

The effect of varying amounts of available magnesium on the quality and yield of Alaska peas was investigated by means of nutrient water cultures under greenhouse conditions. The tests showed that yields of peas are influenced greatly by the amount of magnesium available to the plant, and that quality largely depends upon yield and maturity. A magnesium content of 50 p.p.m. in the nutrient solution resulted in the plants blooming 3 to 7 days before plants grown in the low magnesium treatments (5 p.p.m.), irrespective of the phosphorus concentration of the nutrient solution. The lengths of the blossoming period for the high magnesium treatments were 3 to 4 days shorter than for the low magnesium treatments. Chemical analyses revealed that the uptake of magnesium in plants was directly proportional to its concentration in the nutrient solution. The calcium and potassium contents were inversely proportional to the magnesium concentration of the nutrient solution. Maximum growth and yield of peas occurred with a high concentration of magnesium in the nutrient solution. A study of the viability of mature seeds grown in these solutions shows that seeds produced in the low magnesium treatments germinated slowly, and only 42% of the seeds germinated. At the high magnesium level, germination was 100% better even after 25 days. Phosphorus concentration had little effect on germination. [From authors' summary.]

532. SCHICKE, P.  
La propagation de la maladie de la mosaïque (*Phaseolus* virus 1). (The transmission of [bean] mosaic, *Phaseolus* virus 1.)  
*Saatgutw.*, 1951, No. 3, from abstr. in *Rev. Agric. Brux.*, 1951, **4**: 772.

*Phaseolus* virus 1 is transmitted from plant to plant by aphids (including black bean aphid and peach aphid), and from season to season through the seed. The virus is only seed transmitted, however, if the plants are infected before flowering. Seed transmission can therefore be avoided if it can be arranged that the plants flower early before the aphid appears. Failing this, healthy seed can be obtained by destroying all infected plants at time of flowering. No explanation has been found for the fact that the earliest pods contain more infected seed than those formed later.

533. ELLIS, D. E., AND COX, R. S.  
Control stem anthracnose of lima beans.  
*Spec. Circ. N.C. agric. Exp. Stat.* **11**, 1950, pp. 10, illus. [received 1951].

*Colletotrichum truncatum* causes a brick-red discoloration of the pod; the latter may be killed, or the seeds rendered inedible owing to discoloration or rotting. Leaves may also be affected. The disease is seed-borne, so that it is desirable to obtain seed from the arid regions of the west where plants are not infected.

Other recommended methods of control are the avoidance of replanting on the same soil, and spraying with the proprietary sprays Dithane Z-78 or Parzate at 1.5 lb. per 100 gal. water. These fungicides contain 65% zinc ethylene bisdithiocarbamate. Spraying should be repeated at weekly intervals after the appearance of the disease. C.W.S.H.

534. WALLEN, V. R., AND SKOLKO, A. J.  
Activity of antibiotics against *Ascochyta pisi*.  
*Canad. J. Bot.*, 1951, **29**: 316-23, bibl. 21, being Contr. Div. Bot. Plant Path., Sci. Serv., Dep. Agric., Ottawa, **1102**.

A number of antibiotic substances which have been reported to possess antifungal properties were tested at various dilutions for their fungistatic activity upon spore germination of *Ascochyta pisi*. Actidione, antibiotic XG, and viridin (pH 3.5) were found to be fungistatic at dilutions of 10 p.p.m., gliotoxin and gladiolic acid at 20 p.p.m. The remaining antibiotics were less active, citronin showing no fungistatic activity even at 100 p.p.m. In fungicidal tests of spores of *A. pisi*, antibiotic XG, gliotoxin, actidione, humulol, gladiolic acid, and viridin were active at concentrations of 50 p.p.m. with a 12 hr. exposure, whereas clavacin, lupulol, and citronin required concentrations of 100 p.p.m. The action of these antibiotics upon germination of pea seed on filter paper and upon emergence in soil was tested and, in general, those which possessed the greatest fungistatic and fungicidal activity to *A. pisi* spores were the most phytotoxic. Only antibiotic XG and actidione gave adequate control of *A. pisi* when naturally infected pea seed was treated by soaking the seed in the antibiotic. Actidione, however, seriously reduced germination [Authors' abstract.]

535. ANON.  
Bean rust [*Uromyces phaseoli*] now attacks dwarf beans.  
*Agric. Gaz. N.S.W.*, 1951, **62**: 308-9, illus.

There is at present in New South Wales no dwarf bean variety which is resistant to all the strains of rust in the State. Control measures include early planting and the application of fungicides. Dusting the plants with a mixture of equal parts by weight of a fine grade of dusting sulphur and hydrated lime will give good control, if the first application is made as soon as an sign of rust appears on the plants. Sulphur spray (colloidal sulphur, wettable sulphur or lime-sulphur) may be used in place of the sulphur-hydrated lime dust.

536. ANON.  
L'anguillule du kyste du pois et la maladie de Saint-Jean. (*Heterodera göttingiana* on peas and St. John's disease.)  
*Nieuwe Veldbode*, 1951, No. 22, from abstr. in *Rev. Agric. Brux.*, 1951, **4**: 470-1.

It was thought that St. John's disease of peas was vascular disease analogous to "near wilt" caused by *Fusarium oxysporum*, but trials showed that varieties resistant to "near wilt" were susceptible to St. John's disease. An examination of infected plants showed that the eelworm *Heterodera göttingiana* was present on the roots of all of them. The damage caused is described. The only practicable method of control is crop rotation.



537. MÜLLER, H. J.

Über die Bedeutung der Winterwirte für die Bekämpfung der schwarzen Bohnenlaus (*Doralis fabae* Scop.). (On the significance of the winter hosts for the control of the black bean aphid.)

NachrBl. dtsh. PflSchDienst, Berlin, 1951, 5: 111-15, bibl. 16.

Hibernation of the black bean aphid, which has been recognized as an important virus vector, is aided by the wide cultivation of the mock orange species *Philadelphus coronarius*. Destruction of this winter host in all gardens or aphid control is strongly urged.

538. DITMAN, L. P., AND BICKLEY, W. E.

On control of the Mexican bean beetle.

J. econ. Ent., 1951, 44: 325-8, being Sci.

Pap. Md agric. Exp. Stat. A301, Contr. 2254.

Trials in Maryland in 1949 showed a rotenone, pyrethrum, n-propyl isome dust to be the most effective, out of 6 formulations used, in controlling bean beetles on lima beans, followed in efficiency by a parathion aerosol and a parathion dust. In 1950 the same compound was the most satisfactory of 12 tried. On snap beans, after 4 applications, a reduction in larval population of over 90% was brought about by rotenone, pyrethrum, n-propyl isome dust; straight rotenone dust; parathion dust and aerosol; compound 4049 emulsion and aerosol; and test material No. 1 aerosol.

539. MIDDLEKAUFF, W. W., AND SCiarONT, R. H.

Broad bean weevil.

Calif. Agric., 1951, 5: 1: 7, 13, illus.

The presence of larvae and adults of the weevil *Bruchus rufimanus* has, in the past, rendered the green and dry seeds of the broad bean unfit for human consumption in California. Trials with the newer insecticides have shown that DDT dusts, either alone or with BHC and sulphur, can reduce the weevil infestation considerably. C.W.S.H.

540. JACKS, H., AND CEDERMAN, J. A.

Control of green vegetable bug on French beans.

Orchard. N.Z., 1951, 24: 1: 2-3, bibl. 1, illus.

Satisfactory control of the green vegetable bug, *Nezara viridula* [H.A., 21: 599] on French beans was obtained by spraying with Hexone at the rate of 2 pints in 100 gal. of water. Such applications did not prevent usage of edible pods 24 hours after spraying. Hexone should not be applied to tomatoes as it causes severe injury even at low temperatures.

541. NOLTE, H. W.

Tausendfüßlerfrass an Bohnenkeimlingen. (*Blanjulus guttulatus* injury to bean seedlings.)

NachrBl. dtsh. PflSchDienst, Berlin, 1951, 5: 14-15, bibl. 3, illus.

In a garden at Aschersleben, Germany, almost all the beans planted were destroyed in the seedling stage as a result of feeding injury by the millipede *Blanjulus guttulatus*, the symptoms of which are similar to those caused by *Hylemyia platura*. In a second planting on the same soil the application of E605 dust to the planting hole gave complete protection to the seedlings,

while the controls were annihilated. Earlier reports of attacks by this pest on beans and peas are quoted.

### Mushrooms.

(See also 1048, 1107.)

542. GROVES, J. W.

Mushroom collecting for beginners.

Publ. Canada Dep. Agric. 861, 1951, pp. 15+12 pp. plates.

Descriptions are given of 15 of the more common fleshy fungi to be found in Ontario with directions on how to distinguish the few poisonous or merely non-edible ones. The illustrations in black and white are excellent but would be even better in colour.

543. D'AGUILAR, J., AND VENTURA, E.

Les ennemis animaux des champignons de couche. (Pests of cultivated mushrooms.)

Jardins Fr., 1951, 5: 69-83, bibl. 58, illus.

This summary of our present knowledge on mushroom pests and their control is based on French and foreign literature, mainly English. Information on damage and control is followed by a key for the identification of pests common in France based on the damage caused. A list is then given of pests recorded in Europe and America, arranged systematically, and notes are supplied on predators and parasites.

544. SEINHORST, J. W., AND BELS, P. J.

*Ditylenchus destructor* Thorne 1945 in champignons. (*Ditylenchus destructor* Thorne in mushrooms.) [English summary ½ p.]

Tijdschr. PlZiekt., 1951, 57: 167-9, bibl. 4, illus.

A nematode considered to be *Ditylenchus destructor* has been found attacking the mycelium in mushroom beds in the Netherlands. The trouble—room-sickness [so called because it appears in the room before the mushrooms appear]—consists of a gradual disappearance of the mycelium.

### Onions, shallots and garlic.

(See also 41, 631e, j, s.)

545. WARNE, L. G. G.

Spacing experiments on vegetables. III.

The growth and yield of shallots in relation to spacing, manuring and size of planting material, in Cheshire, 1948.

J. hort. Sci., 1951, 26: 285-95, bibl. 5.

Dutch yellow shallots of two sizes (over 1½ in. diameter, 20 per lb., and less than 1½ in. diameter, 53 per lb.) were planted at three row distances and four plant distances, at two manurial levels, on a fertile loam. The mean yield obtained was at the rate of 11 tons 10½ cwt. per acre. Close spacing increased susceptibility to drought and accelerated ripening. The number of daughter bulbs per plant was greatest when large bulbs were planted, but the number was reduced slightly by close spacing. Bolting was appreciable only in plants from large bulbs and decreased with close spacing. Manuring increased total yield, but barely significantly. The mean bulb weight of daughter bulbs is greatest in plants from small bulbs.—Manchester University.

## 546. MACGILLIVRAY, J. H.

Effect of irrigation on the yield and pungency of onions.

Reprinted from *Food Technology*, 1950, 4: 489-92, bibl. 22.

Six varieties of onion were grown at Davis, Calif., and subjected to three different irrigation treatments. Even though the onions were grown partly during the period of winter rains, the yield was increased by irrigation about 125%. Non-irrigated bulbs are slightly higher in dry matter or total solids but pungency is not greatly affected by irrigation. [From author's synopsis.]

## 547. EDWARDS, G. R.

Insect pests of vegetable crops. VII. Insect pests of onions.

*J. Dep. Agric. S. Aust.*, 1951, 54: 558-61, illus.

Descriptions with notes on control of: onion thrips (*Thrips tabaci*), clean cultivation, DDT spray or dust, nicotine sulphate 1-500 spray; onion nematode (*Anguillulina dipsaci*), crop rotation, soil sterilization with chloropicrin; seedling maggots, avoid excessive amounts of organic manures; brown vegetable weevil (*Listroderes costirostris*), clean cultivation, 2% DDT dusts or 0.1% DDT sprays.

## 548. BOČAROVA, A. P., AND POPOV, P. V.

An effective preparation for the control of onion maggot. [Russian.]

*Sad i Ogorod*, 1951, No. 7, pp. 68-9.

Sprays containing 0.025 and 0.05% NIUIF-100, a proprietary preparation, applied at the rate of 0.5 to 1 l. per row metre gave very satisfactory control of onion maggot. NIUIF-100 is stated to be also effective against other insects, including scales.

## 549. SLOAN, M. J., AND RAWLINS, W. A.

Field trials in onion thrips control.

*J. econ. Ent.*, 1951, 44: 294-301, bibl. 15.

Results of numerous experiments conducted in New York during 1949 and 1950 show the various formulations of heptachlor, dieldrin, chlordane and aldrin to be more effective in controlling onion thrips, *Thrips tabaci*, than comparable DDT formulations.

## 550. TIMONIN, M. I., AND THEXTON, R. H.

The rhizosphere effect of onion and garlic on soil microflora.

*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 186-9, bibl. 15, being *Contr. Div. Bact. Dairy Res. Sci. Serv. Dep. Agric. Canada, J. Ser.* 311.

It was found that the rhizosphere soil of onion and garlic harboured 11 and 12 times respectively more bacteria, and 6 and 3 times more actinomycetes than the control soil. Counts of fungi were found to be 2.5 times greater in the rhizosphere of onion than in the control soil. Rhizosphere of garlic did not show the same stimulative effect upon the fungus flora. The microflora of the root tissues of onion and garlic was not so abundant as in control soil. Thus bacteria constituted only 37.86 and 41.68, actinomycetes 56.69 and 6.32, and fungi 31.73 and 0.00% respectively. The addition to the media of diluted onion or garlic juice drastically reduced the counts of various organisms in the control soil. Thus onion and garlic juices diluted with media to 1:720 strength reduced

the counts of various organisms in the control soil. If the density of the population of the control soil, determined on the media without the addition of juices, is accepted as 100, then the addition of onion and garlic juices reduced the count of bacteria by 91.53 and 87.76% respectively, actinomycetes by 98.43 and 82.11, fungi by 55.77 and 100%. The activity of various physiological groups of bacteria in the rhizosphere soil, root tissues, and the control soil was also determined. [From authors' summary.]

### Root crops.

(See also 18, 34, 631w.)

## 551. WARNE, L. G. G.

Population figures for some root vegetables.

*Fruitgrower*, 1951, No. 2906, pp. 384-6.

A discussion supported by experimental data showing that on fertile soil, provided there is good husbandry and satisfactory germination, maximum yields are likely to be obtained with the following seeding rates or spacings: (1) carrots, 3 lb. seed per acre; (2) globe beet 12 in. rows, thinned to 2 or 3 in.; (3) long beet, 18 in. rows, thinned to 3 or 4 in.; (4) parsnips, 18 in. rows, thinned to 4 or 6 in.

## 552. WARNE, L. G. G.

Spacing experiments on vegetables. IV.

The yield of globe beet grown at twelve spacings and two manurial levels, in Cheshire.

*J. hort. Sci.*, 1951, 26: 296-303, bibl. 7.

Globe beet, grown at 4 row distances (9 in., 12 in., 18 in., and 24 in.) and 3 thinning distances (2 in., 4 in. and 6 in.) and 2 manurial levels (no manure, and 10 cwt. "complete" fertilizer per acre) on a fertile loam, gave a mean yield of 14 tons 2 cwt. per acre. Manuring increased the stand of plants, the total yield of roots, and the yield (weight) of "large" roots. The maximum number of "large" roots was obtained with the closest spacing employed.

## 553. ANON.

Leaf spot of silver beet and beetroot.

*Agric. Gaz. N.S.W.*, 1951, 62: 373-4, illus.

In this disease, caused by the fungus *Cercospora beticola*, the spots are most conspicuous on the foliage but develop also on the leaf and flower stalks, seed balls and seeds. The disease is therefore quite commonly carried by the seed. The spots are characteristically ashy-coloured with a brownish margin. New beet crops should not be planted in proximity to old, infected crops. The seed should be dusted before sowing with one of the proprietary mercury dusts (1 level teaspoonful per lb.) or with copper oxychloride dust (4 level teaspoonfuls per lb.). If seedlings develop the disease at an early stage, remove infected leaves and spray the plants with bordeaux mixture (1-1-10).

## 554. WHIPP, A. A., AND CHAPMAN, R. K.

Control of the variegated cutworm on red beets with DDT and chlordane sprays.

*J. econ. Ent.*, 1951, 44: 430, bibl. 6.

The variegated cutworm, *Peridroma margaritosa*, was effectively controlled by either DDT or chlordane sprays when applied at the rate of 1 lb. of actual toxicant per acre.

555. KVASNIKOV, B. V.

**Choosing carrots for their carotin content.**

[Russian.]

*Sad i Ogorod*, 1951, No. 8, pp. 63-4, illus.

It was found that the carotin  $\beta$  content of carrot roots varied with their degree of coloration, the most intensely coloured roots containing most carotin. The range was from 1.7-3.4 mg./% in very pale roots to 15.0-16.8 in the deeply coloured ones. There is less carotin in the central tissues than in the cortical region. Thus in selecting material for carotin content preference should be given to roots with a small medulla. In orange-red pith the carotin content is 2.6-6 mg./%, in yellow pith 1.7-10.5 mg./%.

556. ANON.

**Carrot virus.***Agric. Gaz. N.S.W.*, 1951, 62: 307-8, illus.

The most important and widespread disease of carrots in New South Wales is caused by the carrot virus. Infected plants are stunted and the petioles are frequently bent backwards, so that the lower surface of the leaf is facing upwards. The edges of infected leaves are at first light green, then yellow, and finally red. Distortion, twisting and shortening of the petioles often result in a rosetted appearance of the leaves. The disease is spread by the common carrot aphid, *Cavariella aegopodii*, and, so far as is known, the virus is not seed-borne. Carrots sown from mid-December till the end of January usually remain healthy and mature normally, but sowings made after this date generally become infected later in the autumn. The variety Osborne Park, though susceptible, shows a useful degree of tolerance to infection.

557. BAKKER, M.

Bestrijding van de phomopsisziekte in zaadwortelen. (Control of the phomopsis disease of seed-umbels of carrot.) [English summary 1 p.]

*Tijdschr. PlZiekt.*, 1951, 57: 157-67, bibl. 2, illus.

*Phomopsis dauci* infects and kills carrot umbels and spreads into the stems, where pycnidia develop. The disease is of economic importance in the seed district of West Friesland, where up to 80% of the seed umbels may be destroyed. Rainy, hot weather favours the spread of the disease. In field trials for control, copper compounds gave the best results.

558. MINISTRY OF AGRICULTURE, LONDON.

**The carrot fly (*Psila rosae*).***Adv. Leaflet. Minist. Agric. Lond.* 68, 1951, pp. 5, illus.

To avoid damage the advice is given to sow late, sow in the open, lift early. Repellents found useful are creosote (on string) and naphthalene strewn in the rows.

559. WRIGHT, D. W.

**The control of the carrot fly (*Psila rosae* Fab.) with benzene hexachloride.***First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 14-20, bibl. 5.

Trials at Cambridge and elsewhere in East Anglia over the years 1945 to 1950 showed that BHC gives a highly efficient control of carrot fly. The use of the isomeric mixture [=crude BHC] sometimes results in contamination of the crop and even of a succeeding root

crop. But with BHC of high gamma content the dosage can be greatly reduced and good control obtained without tainting the crop. Such material is best applied to the carrot seedlings along the rows in a dust or a light mineral oil. Promising results have also been got with seed dressing.

560. WOODS, J. J.

**Experimental results in root crop seed production.***Mimeo. Saanichton Domin. exp. Stat.* 127, 1951, pp. 6.

Work at the Dominion Experimental Station, Saanichton, B.C., from 1916 to 1947 on seed production of sugarbeet, mangels and turnips is briefly summarized. With regard to turnips it is concluded that this crop can be safely wintered in the open in the Saanichton peninsula if the seed is sown about 1 July. A good stage of maturity for harvesting is when the pods will split when rolled between the thumb and forefinger, but seed harvested earlier ripened satisfactorily. No thinning was found necessary when seed was sown at 5 lb. per acre in rows 3 ft. apart.

561. KLOEM, D.

**Jarowisatie van stoppelknollenzaad. (Ver-nalization of turnip seed.)***Maandbl. Landb.VoorlichtDienst*, 1950, No. 5, from abstr. in *Rev. Agric. Brux.*, 1950, 3: 1099.

Overwintering turnips for seed production presents many problems, so the possibility of obtaining seed from 1-year-old plants has been investigated. The results with vernalized seed sown at the beginning of March have been promising. The seed ripened in July, and it was possible to obtain a reasonable crop provided the plants were spaced sufficiently far apart. The plants flowered a few weeks later than those treated as biennials and so suffered less from curculio attack. It was found that the varieties with the lowest cold requirements, such as Lucratief and Voorrang, did not require vernalization. The cold requirements of each variety must be determined individually, but in general a few weeks' vernalization is sufficient.

562. HENKENS, C. H.

**Een bacterie-ziekte in stoppelknollen. (A bacterial disease of turnips.)** [English summary 6 lines.]*Tijdschr. PlZiekt.*, 1951, 57: 124-6.

In 1949 a yellowing of turnips followed by a rot of the root occurred quite generally in the southern provinces of the Netherlands. The yield was low and the turnips could not be kept. The disease appears to be caused by *Erwinia carotovora* [*Bacterium carotovorum*]. Plants grown in naturally infected soil showed symptoms beginning on the lower leaves.

563. DETROUX, L.

Notes sur l'éthologie de la tenthrède de la rave (*Athalia colibri* Christ). Action des insecticides de contact d'origine végétale et de synthèse. (Notes on the biology and control of the turnip sawfly (*Athalia colibri*). Effectiveness of natural and synthetic contact insecticides.) [English and German summaries  $\frac{1}{2}$  p. each.]

*Rev. Agric. Brux.*, 1950, 3: 972-9, bibl. 3, illus.



In Belgium the turnip sawfly is a serious pest only during dry, hot summers following mild winters. The larvae of the second generation cause most damage. In control experiments carried out in the laboratory at the Station de Phytopharmacie de l'État, Gembloux, the effects of rotenone and nicotine were compared with those of several synthetic organic insecticides. The most effective control materials were 0.1% E605, and the rotenone preparations. DDT and HCH proved unsatisfactory. Some of the HETP preparations were effective.

### *Salad crops.*

(See also 631f, r.)

564. DE KONINCK, G.  
De cultuur van het witloof. (Chicory growing.)  
*Cult. Hand.*, 1951, 17: 451-3.

Notes on various operations with four methods of forcing—heating manure, smoke flues, thermosiphons or hot water pipes, electricity.

565. VANDERWALLE, R., AND PARMENTIER, G.  
Une maladie de la chicorée (*Cichorium intibus*) causée par *Verticillium Dahliae* Kleb. (A disease of chicory caused by *Verticillium dahliae*.)  
*Parasitica*, 1951, 7: 69-76.

A verticillium disease of witloof chicory, causing a browning of the leaves, is described. Individual differences of resistance in the plants suggest that control might be effected by selection.

566. HEPBURN, G. A., AND BISHOP, H. J.  
Insects attacking chicory.  
*Fmg S. Afr.*, 1951, 26: 163, 164, 176, bibl. 10.

Cutworms and beetles are the chief pests. DDT, BHC and parathion all offer control, though the unfavourable effect of BHC on flavour necessitates its careful use. Particular measures are recommended.

567. CRNKO, J.  
Estudios comparativos sobre la lechuga. (Variety trials with lettuce.)  
*Idia*, 1951, 4: 42/3: 22-31, bibl. 21, illus.

Nineteen varieties of lettuce, including standard Argentinian varieties and varieties recently introduced to Argentina from the United States, were tested during the period 1948/51 in the trial ground of the Mendoza Experimental Station. Of the crisp-head varieties, Imperial 456 and Great Lakes were the best, having firm heads, a low rate of bolting and good resistance to tip burn. The former was the most uniform. Of the butter-head varieties, California Cream Butter was outstanding for its slowness to bolt. The Criolla cos varieties were very susceptible to tip burn, and Gallega bolted very rapidly. The crisp-head varieties, especially the Imperial types, produced few seeds, whereas the butter-head and cos varieties were abundant seed producers.

568. WEBER, F.  
Sortenvergleichsversuch bei Kopfsalat. (A lettuce variety trial.) [English summary 4½ lines.]  
*Mitt. Klosterneuburg*, 1951, 3: 123-5.

Trials with an Austrian lettuce variety showed that under extreme conditions plants from seed of different origin lack uniformity.

569. HAWTHORN, L. R., AND POLLARD, L. H.  
Selection of Great Lakes lettuce strains for higher seed yields.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 323-8, bibl. 2.

The Great Lakes variety has a reputation of being a poor seed producer, higher seed production being associated with poor market strains. Breeding and selection for seed production and for satisfactory market type was followed by a trial of 25 inbred strains. Seed yield differences were so great that the highest yielding strain produced over four times as much seed as the lowest one. The strains were given rankings for seed production and for marketable heads, and it was shown that strains could be produced combining both desirable characters. C.W.S.H.

570. WINTER, E. J.  
The possibility of producing seed of certain varieties of summer lettuce in the United Kingdom.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 35-40.

Vernalized plants bolted about 13 days sooner than unvernallized plants grown from seeds germinated on the day vernalization ended. Vernalized plants bolted at the same time as unvernallized plants sown on the day vernalization began. "Vernalizing" below freezing point retarded the date of bolting by about two weeks. High nitrogen with high potassium, medium nitrogen with high potassium, and medium nitrogen with low potassium caused early bolting. High nitrogen with low potassium caused late bolting and the production of poor shrivelled seed. The effect of relatively high temperature (30° C.) and of low temperature (below freezing point) on imbibed and germinated lettuce seeds was studied. It is thought that the effect of vernalization below freezing point might be useful to commercial lettuce producers. Further work is necessary.

571. AYERS, A. D., WADLEIGH, C. H., AND BERNSTEIN, L.  
Salt tolerance of six varieties of lettuce.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 237-42, bibl. 9.

Six warm weather varieties—Imperial 152, Imperial 847, Great Lakes, New York 12, New York 515, and Big Boston—showed moderate tolerance and there was no significant difference in tolerance between them. Irrigation water containing an added 3,000 p.p.m. of sodium and calcium chlorides caused a 34% reduction in plant weight while greater concentrations caused larger reductions. Changes in the mineral composition of the leaves are given. Since saline irrigation caused stunting but no toxicity symptoms it is concluded that the growth responses were due primarily to physiological scarcity of water caused by the high concentrations of the chlorides. C.W.S.H.

572. ELLIS, D. E., AND COX, R. S.  
The etiology and control of lettuce damping-off.  
*Tech. Bull. N.C. agric. Exp. Stat.* 93, 1951, pp. 33, bibl. 54, illus.

*Rhizoctonia solani* is the organism most frequently associated with damping-off in lettuces, but *Pythium* spp. are also present. In seed treatment tests the use of Cuprocid (2.0% by weight) or Spergon (0.62% by weight) resulted consistently in increases in stand in comparison with non-treated controls. Under both greenhouse and plant bed conditions Fermate or Thiosan drenches applied at 10-day intervals after seeding, at concentrations ranging from 1-100 to 4-100, gave excellent control of post-emergence damping-off without being noticeably phytotoxic.

573. PETTINARI, C.

*Stemphylium botryosum* Wallr. su foglie di lattuga. (*Stemphylium botryosum* Wallr. on lettuce leaves.) [English summary 7 lines.] *Ann. Sper. agrar.*, 1951, 5: 607-16.

A disease of lettuce, not yet reported in Italian phytopathological literature, has been found in Apulia. It is caused by a form of *Stemphylium botryosum* Wallr. The disease causes necrotic dark spots, consisting of concentric rings, of 5 mm. average diameter, oval or irregularly polygonal, surrounded by a yellowish zone. The results of tests of control methods, previously reported, and formulae suggested by Dippenaar are given.

574. SPENCER, D. M.

**Watercress investigations.**

*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 52-6, bibl. 7.

A survey of commercial watercress beds showed that reduction in yield may be due to weeds, insects, nutritional disorders and possibly a virus, but that the main cause of loss was a single disorder found in every bed visited and known as crook root. The first obvious symptom was chlorosis of the foliage which became marked in early winter. This was accompanied by distortion of the roots and was followed sometimes by death. When plants survived, recovery began about April. Two distinct fungal bodies were found belonging to the same or different species of the Plasmodiophorales. Attempts to germinate spores and produce infection were not very successful.

*Spinach.*

575. GRÜTZ, W.

Frischhaltung von Spinat durch Kali-düngung. (The effect of potassium fertilizers on the keeping quality of spinach.) *Gartenwelt*, 1951, No. 9, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 905-6.

Field experiments showed that the water content of spinach leaves was higher and the rate of evaporation lower where the plants had been well manured with potassium. The water content was higher after applications of potassium chloride than after potassium sulphate, but the rate of evaporation was lower and the keeping quality of the leaves during transport was better after applications of potassium sulphate.

576. FRIEDMAN, B. A., LIEBERMAN, M., AND KAUFMAN, J.

A comparison of crown-cut and clip-topped spinach prepackaged at a terminal market. *Proc. Amer. Soc. hort. Sci.*, 1951, 57: 285-7.

Spinach plants with crown removed (clip-topped) lasted as well as plants with crown intact (crown-cut), but with the clip-topped less labour was required for prepackaging and there was less waste. C.W.S.H.

577. FRIEDMAN, B. A.

**Control of decay in prepackaged spinach.**

*Phytopathology*, 1951, 41: 709-13.

Bacterial soft rot is the principal cause of decay and reduction in shelf-life of prepackaged spinach. Although inorganic and organic chlorine compounds reduced the numbers of bacteria in the wash water and on spinach leaves, chlorination of the wash water did not decrease decay or increase shelf-life of the prepackaged product. Packing spinach in silver-treated cellophane bags did not significantly control decay or lengthen shelf-life. More thorough centrifugal drying of washed spinach reduced decay and lengthened shelf-life of the prepackaged product. Refrigeration of prepackaged spinach was the best means of controlling decay and increasing shelf-life. [Author's summary.]—U.S. Dep. Agric.

578. MILES, M.

**The spinach stem fly [*Hylemyia echinata*].**

*Agriculture, Lond.*, 1951, 58: 332-4, illus.

A preliminary account of an insect, which is troublesome in spinach grown for canning, and the difficulty of controlling it.

*Sweet corn.*

579. ERWIN, A. T.

**Sweet corn—mutant or historic species?**

*Econ. Bot.*, 1951, 5: 302-6, bibl. 7.

The generally accepted viewpoint that sweet corn has been handed down through the ages by the American Indians from pre-Columbian times is challenged in this article, where it is regarded as a mutation of dent corn which may occur at any time and anywhere that extensive areas of field corn exist.

580. TURNER, N.

**Relation between sugar content of corn and infestation and survival of the European corn borer.**

*J. econ. Ent.*, 1951, 44: 307-9, bibl. 6.

In studies conducted in Connecticut on sweet and field corn, no relation was observed between sugar content and infestation, nor between sugar content and survival of corn borers.

*Sweet potatoes.*

581. CALMA, V. C., AND PANINGBATAN, E. S.

**Field test of six varieties of sweet potato.**

*Philipp. Agric.*, 1950, 34: 84-9, bibl. 4, being *Contr. Exp. Stat.* 1566.

The performance of 6 varieties of sweet potato was studied under wet and dry season culture in the Philippines. Segurado and Tamsang Puti matured in about 80 days in the dry season and in 95-100 days in the wet season. Samar Big Yellow, Kinalamayas, Sinawa, and Pirurutang matured in 95 days in the dry season and 126 days in the wet season. In the dry season Samar Big Yellow was the most vigorous and Segurado gave the highest yield of marketable roots, whereas in the wet season Segurado was the most

vigorous and Tamsang Puti gave the highest yield. For eating quality Samar Big Yellow and Tamsang Puti ranked highest. All varieties were attacked by the sweet potato weevil (*Cylas formicarius*); in the dry season Segurado was the most severely attacked, but in the wet season there was no difference between the varieties and the infestation was less severe.

582. MONTELARO, J., AND MILLER, J. C.  
A study of some factors affecting seed setting in the sweet potato.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 329-34, bibl. 14.

Sweet potato breeding work is often retarded by the failure of some varieties to set seed under certain conditions. In the pollination of 13,528 flowers of 5 varieties it was shown that there were no differences between the 5 as pollen parents, but that 2 varieties, Nos. 201 and 241, were highly sexually incompatible when selfed or crossed as female parents under any conditions. There were no significant differences between the set of open and cross-pollinated flowers. There was a decline in seed set during very hot or very cold weather. C.W.S.H.

583. LUTZ, J. M., PARK, J. K., AND DEONIER, M. T.  
Influence of methods of harvesting sweet potatoes on their storage behavior.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 297-301, bibl. 5.

Six methods of harvesting Porto Rico sweet potatoes were tried in Laurel, Mississippi. The methods were 16-in. turning plough, slow; 16-in. turning plough, fast; Middlebuster; 12-in. turning plough; rod wing middlebuster; mechanical digger. Some of the potatoes were heaped, some picked up direct into crates, while others were sacked. The smallest loss through decay was found with those sweet potatoes which were harvested by 12-in. ploughs or rod wing middlebusters. Most decay was found with the potato digger. Direct picking into crates was most satisfactory. Sacked sweet potatoes showed most decay and greatest loss in weight. C.W.S.H.

584. COOLEY, J. S., AND KUSHMAN, L. J.  
Effect of pasteurization on black rot of sweet potatoes.  
*Phytopathology*, 1951, 41: 801-3.

Sweet potatoes from crops having some black rot (*Endoconidiophora fimbriata*) at harvest were given heat treatment (pasteurization) for 8, 16, and 24 hr. at each of three temperatures, 100°, 105°, and 110° F. No black rot developed on those held at 110° and 105° for 24 hr., while on those held at 110° for 16 hr. the rot was not completely controlled, but there was less than in the unpasteurized lots. The treatment did not control other kinds of rot and did not perceptibly damage the roots.

#### Swiss chard.

585. BAIRD, G. B., AND MEHLICH, A.  
The effect of soil exchangeable cations on Swiss chard and cotton.  
*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 201-5, bibl. 12, being *Contr. Dep. Agron. N.C. agric. Exp. Stat., J. Ser.* 358.

The effect of exchangeable Ca, Ba, Sr, Mg, K, Na, NH<sub>4</sub>, and H ions on the growth and mineral content of Swiss chard and cotton was studied in greenhouse pot cultures. In a second experiment Swiss chard was grown on a Portsmouth soil at a constant level of Ca, but with wide variations in the ratios Ca: Mg, Ca: K, and Ca: Na. The order of the proportionate amounts of cations taken up was Na > K > Mg > Ca. From the average of the c values the Ca requirement of Swiss chard was calculated. This value was found to be between those of soybeans and oats. [From authors' summary.]

#### Tomatoes, eggplants and capsicums.

(See also 80, 81, 85, 631i, o, q.)

586. FERGUSON, I. A. C.  
Four virus diseases of solanaceous plants in Trinidad.

*Plant Dis. Repr.*, 1951, 35: 102-5, bibl. 3.

Symptoms of virus infection are common on solanaceous plants in Trinidad, British West Indies. In particular, tomato, eggplant, sweet pepper and tobacco are affected. Tobacco mosaic on the Island has already been mentioned (*H.A.*, 14: 869). Other virus diseases described for the first time in this paper have been tentatively named: tomato twisted leaf, tomato bronze leaf, eggplant mosaic, and pepper mosaic. The symptoms of these are tabulated for the hosts mentioned, and a comparison made of the virus properties.—Salisbury Exp. Stat., S. Rhodesia.

587. CAPINPIN, J. M., AND BERENGUER, J. L., JR.  
A cytogenetic study of parthenocarp in eggplant resulting from interspecific pollination.  
*Philipp. Agric.*, 1950, 34: 65-77, bibl. 24, illus., being *Contr. Exp. Stat.* 1564.

1. Petunia and tomato pollen stimulated parthenocarpic development of the ovary of the Golden Gate Long Purple variety of eggplant; the former produced fair-sized fruit, and the latter small fruit. 2. Datura pollen stimulated parthenocarpic development of the ovary of the Golden Gate Long Green variety and produced fair-sized fruit. 3. Tobacco pollen did not stimulate parthenocarpic development of the ovaries of the following varieties: the Native Long Purple, the Long Green, the Round Purple (New York Improved), the Golden Gate Long Purple, and the Golden Gate Long Green. 4. Artificial parthenocarp in the five eggplant varieties was not readily induced by interspecific pollination; the degree of response is probably a varietal characteristic in eggplant. 5. The staminate parents exhibited degrees of pollen germination on the stigma and of pollen-tube penetration in the stylar tissue of the eggplant in descending order as follows: petunia, datura, tomato, and tobacco. 6. Natural parthenocarp in the five eggplant varieties is probably not possible under Philippine field conditions. 7. Bud-pollination was successful in the production of parthenocarpic fruits in the Golden Gate varieties. 8. The three methods of breaking incompatibility barriers failed to induce fruit development. [Authors' summary.]—College of Agriculture, Laguna.



588. SMITH, P. G., RICK, C. M., AND HEISER, C. B., Jr.

*Capsicum pendulum* Willd., another cultivated pepper from South America.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 339-42, bibl. 7, illus.

This species was found among cultivated peppers in Bolivia, and was subsequently found in a collection from Peru and Ecuador. The species is described in detail. The size and shape of the fruit are very variable, and the elongated orange-coloured fruits are the most popular of all peppers in coastal Peru. In Indiana the species has borne fruit profusely at the same time as varieties of *C. annuum*. Crossing has proved difficult and no fruit has been produced on  $F_1$  plants. C.W.S.H.

589. MARTIN, J. A., AND CRAWFORD, J. H.

Several types of sterility in *Capsicum frutescens*.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 335-8, bibl. 6.

Strains of *Capsicum frutescens* have been found which are sterile, male-sterile in the field or male-sterile in the greenhouse. These types are described and their practical use in breeding work and the production of hybrid seed is discussed. C.W.S.H.

590. SMITH, P. G.

Deciduous ripe fruit character in peppers.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 343-4, bibl. 4.

Deciduous character of pepper.

*Calif. Agric.*, 1951, 5: 6: 12, illus.

Commercial varieties of *Capsicum annuum* have fruit which adhere tightly to the calyx. Deciduous fruit, which will not, however, drop too easily but will come away from the calyx with a light pull, are desirable. Crossing the Mexican chili with chili Piquin and selfing and back-crossing has shown that the deciduous character is inherited as a single dominant gene. C.W.S.H.

591. OLEŇNIKOVA, T. V.

Light and temperature requirements in raising pepper. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 77: 921-4, bibl. 7.

Species and varieties of pepper (*Capsicum*) from a number of regions in both the eastern and western hemispheres were grown under various day-lengths and temperatures. Though reaction to day-length varied greatly, most of them flowered earliest under 14-hour-day conditions. Peppers usually require high temperatures, particularly in the early days of growth, but a variety from the mountains of Bolivia flowered early under cool conditions (in the open), and much later if raised in a greenhouse.

592. COSTA, A. S., AND ALVES, S.

Mosaico do pimentão. (*Capsicum* mosaic.) [English summary 5 lines.]

*Bragantia*, 1950, 10: 95-6, bibl. 3, illus.

The symptoms are described of a mosaic disease of sweet peppers (*Capsicum annuum*) very prevalent in the state of São Paulo, Brazil. Studies made at the Instituto Agronômico, Campinas, on the host range and properties of the causal virus indicate that it

belongs to the potato virus Y group. The pepper mosaic virus has been transmitted by at least 4 species of aphid: *Myzus persicae*, *Macrosiphum solanifolii* and 2 other species which have not yet been determined. Preventive measures recommended are (1) control of the vectors in the nursery and field and (2) selection of resistant varieties. In preliminary trials in which 6 varieties were inoculated with the virus, none showed a high degree of resistance, but Porto Rico Wonder showed greater tolerance than the others.

593. ELMORE, J. C., AND CAMPBELL, R. E.

The pepper weevil.

*Leaf. U.S. Dep. Agric.* 226, revised 1951, pp. 7, illus., 10 cents.

The pepper weevil (*Anthonomus eugenii*) is the most important insect pest of peppers [*Capsicum*] in the United States. Both grub and adult do damage, the former to the blossom buds or pods, the latter to these and to the foliage also. Control is by dusting with 5% DDT or with cryolite containing 50% sodium fluoaluminate. Residues of these have to be removed before marketing, and this is done by agitation for 1 minute in a 2% HCl solution heated to 100° F. for the cryolite and by water containing a detergent washing powder (1 lb. to 50 gal.) for DDT.

594. SERVICE DE LA DÉFENSE DES VÉGÉTAUX.

Le dessèchement de l'extrémité pistillaire de la tomate et du piment. (Blossom-end rot of tomato and capsicum.)

*Mémento Dir. Agric. Maroc* 37, 1951, pp. 6, illus.

The blossom-end rot of tomato and of red pepper fruits (*Capsicum annuum*) is described and considered to be a physiological disorder brought about by lack of equilibrium between the intake of water and evaporation, as a result of unsuitable water supply and temperature of soil and air. Proper regulation of watering is one of the chief measures of control.

595. CASTRONOVO, A.

Los tomates cultivados alrededor de Buenos Aires. (The tomatoes of the Buenos Aires district.)

*Idia*, 1951, 4: 37/39: 2-5, illus., being *Publ. Inst. Fitotec.* 130.

A brief account of the methods of growing tomatoes practised in the Buenos Aires district is followed by a description of the 3 types mainly grown, Platense, Criollo and Redondo. These types are all rather heterogeneous but are more resistant to virus infection and to cracking than the introduced varieties.

596. MURPHY, E. F., AND COVELL, M. R.

Tomatoes in Maine.

*Bull. Me agric. Exp. Stat.* 489, 1951, pp. 69, bibl. 111.

Consideration is given to the effect on vitamin C content of variety, heredity, region, crop year, maturity, open air or greenhouse cultivation, soil, weather, fertilizer, light, and the vitamin C content of the leaf.

597. NONNECKE, I. L.

Prairie tomato culture.

*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 54-5, bibl. 5.

The development of tomatoes from the time when ripe

fruit on the prairies was a curiosity till present day is briefly outlined. The list of recommended varieties includes: Bounty, Farthest North, Early Chatham, Early Alberta, Earlinorth, Meteor, Mustang and Morden Yellow.

598. CHANASYK, V.

**F<sub>1</sub> hybrid outlook in tomatoes.**

*Rep. Proc. 7th annu. Mtg west. Canad. Soc.*

*Hort.*, 1951, pp. 57-62, bibl. 17.

A review of past achievements in hybrid tomato developments and an evaluation of their present position and future are summarized as follows: F<sub>1</sub> hybrids have given total yield increases of up to 40%. Substantial increases in earliness have been obtained. Large fruit size is possible in F<sub>1</sub> hybrid combinations. Hybrid tomatoes are capable of expressing resistance to drought and cool growing conditions. They have shown resistance to septoria leaf spot and early blight. The cost of hybrid seed may be markedly reduced by the use of male sterile mutants and F<sub>1</sub> seed. The F<sub>1</sub> hybrid outlook at present is promising for market garden, greenhouse and home production, particularly in the short season areas such as the central and northern prairies of Canada.

599. AIZENŠTAT, R. S.

**The effect of rearing first generation hybrids under widely different ecological and geographical conditions on the nature of the segregation.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 459-60.

Tabulated data show that F<sub>1</sub> tomato hybrid seedlings, when grown in different regions of Russia, react differently according to the climatic and ecological conditions under which they are raised.

600. HAZINA, E. P.

**Vegetative hybridization in breeding work.** [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 9: 17-23, illus.

Experiments are described in which the tomato variety Humbert was grafted on *Solanum* sp. to produce vegetatively hybridized fruits, and the fourth generation hybrids on tomato variety Marglobe and on "dereza" (? *Robinia* sp.). The tabulated results indicate an increase in weight of the fruit of the hybrid forms over the original variety. It is concluded that vegetative hybridization is an expedient that can be usefully employed in breeding.

601. FADDEEVA, T. S.

**Change of dominance in hybrid tomatoes induced by grafting.** [Russian.]

*Bot. Zhurnal*, 1950, 35: 561-70, bibl. 2, illus.

From results obtained in grafting hybrid tomato seedlings, the following conclusions are drawn. The character of the segregation in the F<sub>2</sub> generation is greatly modified in relation to the conditions under which the first generation is raised. The dominance of some characters is altered as a result of grafting on the parent mentor. The segregation depends on the type of the original F<sub>1</sub> fruit, and also on the conditions under which the seeds developed in the fruit (whether the plant was on its own roots or whether it was grafted). The act of grafting and the unusual

condition of growth on the rootstock plant are factors inducing the development of characters which ordinarily remain recessive and do not show. The method of grafting and the character of the union affect the degree of the effect of the rootstock on the scion. Grafting young scion sprouts in tissues internal to the cortex appears to be the most effective means of obtaining changes in the scion.

602. LAWRENCE, W. J. C., and CALVERT, A.

**Artificial light for seedlings.**

*Fruitgrower*, 1951, No. 2903, pp. 250-1.

At the John Innes Horticultural Institution tomato seedlings were pricked out within 2-3 days of germination and packed pot- or block-tight under 400 watt, high pressure mercury vapour lamps, suspended 3 ft. above the bench. Illumination was for 9-10 hr. a night either starting at sunset or finishing at sunrise. The seedlings were illuminated for 20 nights, then removed and grown on under natural light alone. Two following batches of seedlings were treated similarly. The illuminated tomatoes flowered and fruited about 2 weeks earlier than usual. The possible fuller utilization of these lamps and the problems involved are discussed. Until more definite information is available, it is recommended that the total light per day shall not exceed 18 hr. and the dark period shall not be broken. Timing in general and optimum day and night temperatures need further consideration.

603. HUBER, G.

**Schrägpflanzung der Tomaten. (Oblique planting of tomatoes.)**

*Gartenwelt*, 1951, No. 7, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 774.

However deeply tomatoes are planted, roots do not develop at a depth greater than about 20 cm. A larger root system can be obtained, however, by planting obliquely and thus having a greater area of stem underground. The aerial parts of the plant will soon grow erect and a yield increase of 15-20% is generally obtained.

604. KERR, E. A.

**Effect of extra foliage on greenhouse tomato production.**

*Rep. Vineland hort. Exp. Stat., Ontario, for 1949 and 1950*, pp. 28-9, illus.

Using 39 varieties of greenhouse tomatoes, a type of pruning in which all the sideshoots were allowed to retain 2 leaves was compared with standard pruning in which all sideshoots were removed. Plants given the standard pruning came into production first, and the type of pruning had no effect on total yield. It is concluded that the extra foliage type of pruning is not desirable under Ontario cultural conditions.

605. JOHANNESSON, J. K.

**Magnesium deficiency in tomato leaves.**

*N.Z. J. Sci. Tech., Sec. A*, 1951, 33: 2: 52-7, bibl. 6, illus.

(1) A chlorosis of the leaves of glasshouse tomatoes of Potentate variety in the Hutt Valley has been related to a low level of magnesium in the leaves. (2) The soils are of normal exchangeable magnesium content, high base saturation, and fertilized heavily with potash and phosphate. (3) Analytical data are presented for the distribution of CaO, MgO and K<sub>2</sub>O in the plant

nd leaves; as little as 0.06% MgO has been found in chlorotic tissue. (4) An inverse relationship is shown between MgO and CaO. [Author's summary.]—Soil Bureau, D.S.I.R., N.Z.

606. MARX, T., AND SAHM, U.

Gefäßversuche zu Tomatenpflanzen mit steigenden Mangan- und Borgaben. (The application of increasing amounts of manganese and boron to tomato plants in pot experiments.)

Z. Pflernähr. Düng., 1950, 51: 97-105, bibl. 37.

In these experiments NPK was omitted so as not to obscure the action of the trace elements. Potassium permanganate was found to produce the maximum increase in yield, viz. 30.2%, if applied at a rate of 0.9-4 mg. per plant, the lowest level tested. In the boron series a maximum increase of 40.1% was obtained with an application at the highest level of 56 mg. boric acid per plant. A combined supply of the two elements did not produce any further increase in yield. Calculated per 100 plants the recommended rate of application is: 21 g. potassium permanganate and 45.6 g. boric acid in 100 litres water each.—Biol. Zentralanst. f. Land- u. Forstw., Berlin-Dahlem.

607. SOMERS, G. F., KELLY, W. C., AND HAMNER, K. C.

Influence of nitrate supply upon the ascorbic acid content of tomatoes.

Amer. J. Bot., 1951, 38: 472-5, bibl. 14.

Tomatoes were grown in sand culture with varying amounts of nitrogen supplied as nitrate. All of the nitrogen treatments influenced growth as measured by the height of pruned, staked plants. Nitrate supply for the month prior to the onset of ripening influenced fruit production and the ascorbic acid content of the fruits. High nitrate supply was associated with high fruit production, but with low ascorbic acid content. The nitrate supply after the onset of ripening influenced neither fruit production nor the ascorbic acid content of the fruits produced. It was found that the ascorbic acid content of the fruits, at the last harvest, was associated with the degree to which they were shaded. It is suggested that differences in growth associated with differences in nitrate supply for the month prior to the onset of ripening may result in differences in the degree to which the fruits are shaded and may explain the observed differences in ascorbic acid content. [From authors' summary.]—Bur. Plant Indust., Soils, agric. Engng, U.S.D.A.

608. MOLENAAR, A., AND VINCENT, C. L.

Studies in sprinkler irrigation with Stokesdale tomatoes.

Proc. Amer. Soc. hort. Sci., 1951, 57: 259-65.

Revolving sprinklers, placed 40×40 ft. apart, and delivering 3-78 gal. per minute from  $\frac{1}{2}$ -in. nozzles at 30 lb. per sq. in. pressure, were used to deliver varying quantities of water at varying intervals. Eleven inches of water gave the best returns, and the usual interval between irrigations of 8 days was satisfactory. Twenty inches reduced yields and increased fruit cracks. A comparison with furrow irrigation was spoilt by faulty picking, but cracking percentage was rather high under both treatments. C.W.S.H.

609. SPENCER, K.

Tomato root distribution under furrow irrigation.

Aust. J. agric. Res., 1951, 2: 118-25, bibl. 9, illus.

A study was made of the root distribution of tomato plants at the conclusion of the fruiting period when growth had ceased. The plants had been grown under furrow irrigation on a sandy loam. Root distribution was determined by taking soil samples with a Veihmeyer tube and measuring the length of roots in each sampling unit. 75% of the roots were in the top 40 cm. of soil and the root systems overlapped in the rows, in which the plants were 2½ ft. apart. Superphosphate applications increased the total length and median depth of roots. It is suggested that the fact that the bulk of the roots was in the surface layers indicates that interrow cultivation should be discontinued as early as possible. It is also pointed out that there was evidence of root concentration around the superphosphate band, but that the optimum position for this band varies with the moisture condition of the soil.—Commonwealth Irrigation Station, Griffith. C.W.S.H.

610. WOODHEAD, C. E., AND JACKS, H.

Effect of proprietary plant growth substances on fruit set and development of tomatoes.

N.Z. J. Sci. Tech., Sec. B, 1951, 32: 5: 1-7, illus.

Normally-pollinated plants and emasculated plants of Potentate tomato were treated in the glasshouse with three commercial fruit-setting preparations. Under conditions unfavourable for pollination the set of marketable fruit was improved, especially on the first truss, and the fruit matured earlier when the trusses were sprayed with materials containing beta-naphthoxyacetic acid. On the other hand, when conditions favoured pollination, little or no advantage was gained by treatment. Seedless fruit set by Fulset and TP Tomato-set (both containing beta-naphthoxyacetic acid) was of similar average size to fruit on pollinated plants. Apart from the absence of seed, the frequently green colour of the pulp was the only distinctive feature. Wilting and contortion of foliage followed treatment with C.P.3 (containing alpha-naphthaleneacetic acid and naphthyl acetamide). Other treatments had no harmful effect on plants. [Authors' summary.]—D.S.I.R., Auckland, N.Z.

611. STURIALE, F.

Effetti dell'acido  $\beta$ -naftossiacetico sulla partenocarpia del pomodoro. (The effect of  $\beta$ -naphthoxyacetic acid on parthenocarp in the tomato.)

Humus, 1951, 7: 9: 19-22.

Trials at the agricultural Institute of Messina on Tonde Liscia and two other tomato varieties with  $\beta$ -naphthoxyacetic acid at various concentrations confirmed previous indications that larger tomatoes with fewer seeds result from such treatment.

612. VENKATARATNAM, L.

A hormone for improving fruit set and inducing seedlessness in tomatoes.

Indian Fmg, 1950, 11: 191-3.

Experiments were conducted using "P.P. Tomato



Set", containing  $\beta$ -naphthoxyacetic acid, for improving the set of tomato fruits and inducing parthenocarp. A concentration of 1:1,500 in water was found to be most effective. Plants in tubs sprayed at regular intervals with the hormone at this concentration gave a 20% increase in fruit with some fruits completely seedless. In a field trial, with spraying of flower clusters twice a week, there was an increase in fruit set, and a small proportion of the fruit was seedless, but the total weight of fruit harvested was not appreciably increased. C.W.S.H.

613. SINGLETARY, C. C., AND WARREN, G. F.  
Influence of time and methods of application  
of hormones on tomato fruit set.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57:  
225-30, bibl. 9.

It was considered that hormones might overcome failures to set which often accompany excessively cool or hot weather. PCA at 30 p.p.m. and BNOA at 50 p.p.m., with or without the addition of fungicide spray and applied during periods of low night temperatures, increased early yields, but total yields through the season were not increased. In hot weather, with maximum temperatures of about 90° F., yields were reduced by hormone sprays, and the foliage was injured. In a greenhouse experiment, however, with temperature at 90° F., fruit set was increased by a PCA cluster spray. Cluster sprays did not increase the set when growing conditions were favourable. C.W.S.H.

614. SPENCER, E. L., AND BECKENBACH, J. R.  
Blossom-end rot of tomatoes.  
*Circ. Fla agric. Exp. Stat.* S-6, 1949,  
pp. 7 [received 1951].

The symptoms of, and the factors causing, blossom-end rot are described. Control measures involve: regulating the water table, which should be maintained as constant as possible; maintaining a proper pH, at about 6.0; maintaining an adequate supply of calcium—the use of limestone or basic slag for pH control also supplies calcium; side-dressing with nitrate nitrogen when the plants reach blooming size; increasing soil aeration by shallow cultivation; planting a resistant variety, e.g. Rutgers or Manahill.

615. CHAMBERLAIN, E. E., AND FRY, P. R.  
Influence of method of tomato seed extrac-  
tion on seed transmission of tobacco-mosaic  
and tomato streak.  
*N.Z. J. Sci. Tech. Sec. A*, 1951, 32: 2:  
19-23, bibl. 7.

Both the type and tomato-streak strains of tobacco-mosaic are transmitted to a small percentage of tomato seedlings raised from uncleaned seed. These diseases are not transmitted to seedlings when seed is cleaned by fermentation or hydrochloric acid treatment. There is a relatively high concentration of virus on uncleaned seed, but the amount is considerably reduced by fermentation and the virus is removed or reduced to a low concentration by acid extraction. The evidence indicates that the virus is carried only on the surface of the seed and suggests that seedlings become infected during or after emergence from the seed.—D.S.I.R., Auckland, N.Z.

616. COSTA, A. S., FORSTER, R., AND FRAGA C., JR.  
Contrôle de vira-cabeça do tomate pela  
destruição do vetor. (Controlling spotted  
wilt of tomatoes by destruction of the  
vector.) [English summary 10 lines.]  
*Bragantia*, 1950, 10: 1-9, bibl. 3, illus.

At the Central Experimental Station of the Institute of Agronomy, Campinas, Brazil, 6 insecticides were tested against the thrips *Frankliniella* sp. for control of spotted wilt of tomatoes. The most effective control was given by Rhodiatox (5% p-nitrophenyl diethyl thiophosphate) and Hexason 2540M (a mixture of BHC 2% gamma isomer, 5% DDT and 40% wettable sulphur). Tartar emetic and toxaphene gave some control. On the basis of these results the following spray programme is suggested for control of the disease in local tomato plantings: in the seedbed, 0.25-0.5% Rhodiatox or 0.15% Hexason every 3-5 days; in the nursery, 0.5% Rhodiatox or 0.15% Hexason every 3-5 days; in the field, 0.5-1.0% Rhodiatox or 0.25% Hexason every 5-7 days for the first 40 days after planting out.

617. FLINT, T. J.  
The three-dimensional shape of crown gall  
cells and a comparison with normal cortical  
cells of tomato stem.  
*Amer. J. Bot.*, 1951, 38: 342-54, bibl. 48.

Examinations of the cells of the cortex of a tomato stem and of a primary crown gall, caused by *Agrobacterium tumefaciens*, showed that there were only small differences in the average number of faces even when intercellular spaces were included. If these interstices are regarded as forerunners of contacts lost to the cells, and the average number of contacts with spaces are subtracted from the average number of faces not counting intercellular spaces, then there were more faces in the crown gall tissue cells. C.W.S.H.

618. SCHROEDER, W. T.  
Field reaction of 17 tomato varieties to  
three diseases in 1949 and 1950 at Geneva,  
New York.  
*Plant Dis. Repr.*, 1951, 35: 160-1.

Results are tabulated from field observations to show varietal reaction to blossom-end rot (non-parasitic), anthracnose (*Colletotrichum phomoides*) and verticillium wilt (*V. albo-atrum*).

619. SCHROEDER, W. T., AND TAPLEY, W. T.  
A three-year response of six varieties of  
tomato to a fungicide spray program.  
*Abstr. in Phytopathology*, 1951, 41: 660.

A five-application schedule of ziram-ziram-bordeaux-ziram-bordeaux was used on the plots. The 3-year average increase over controls ranged from 2 tons per acre for the variety Wisconsin 55 to 7 tons for Rutgers. Increases within individual years ranged as high as 10 tons per acre. Red Jacket outyielded all other varieties. The effect of spraying on the incidence of several diseases is noted and the incidence or effect of these diseases on different varieties is examined.

620. BORDERS, H. I.  
Tests of fungicides for the control of tomato  
plant diseases in south Georgia, 1949-50.  
*Plant Dis. Repr.*, 1951, 35: 98-101, bibl. 1.

Nabam (Dithane D-14) plus zinc sulphate and lime,

and sineb (Dithane Z-78) afford good control of both late blight (*Phytophthora infestans*) and grey leaf spot (*Stemphylium solani*).—Georgia Agricultural Experiment Station.

621. ARK, P. A.

Sodium salt of *o*-hydroxydiphenyl, a promising chemotherapeutant.

*Plant Dis. Rep.*, 1951, 35: 44.

The author finds from tests with tomato, pepper, marigold and snapdragon plants, that the sodium salt of *o*-hydroxydiphenyl, sold under the trade name of Natriphene, merits investigation as a promising agent for the control of damping-off fungi. It has been used successfully to control certain bacterial diseases of orchids (see No. 810).—Univ. of Calif.

622. POUND, G. S.

Late blight on tomatoes.

*Wis. Hort.*, 1951, 41: 243, illus.

While the spores which spread late blight, *Phytophthora infestans*, on tomatoes are very short-lived and do not overwinter, the spring initiation of the disease in Wisconsin may be due to overwintering of the fungus as mycelium in potato tubers; wind-borne spores may carry the disease northwards in the summer from infected areas in the south; inoculum may spend the winter on greenhouse-grown tomatoes, or on green-wrapped tomatoes sold in the early spring.

623. WILSON, J. D.

Tomato late blight control in 1950.

*Res. Circ. Ohio agric. Exp. Stat.* 11, 1951, pp. 20, bibl. 10.

Late blight (*Phytophthora infestans*) is dependent on the weather for its initiation and development each year. It is favoured by the simultaneous occurrence, over a period of at least 12 hr., of temperatures below 60° F. and relative humidities of 95% or over. The recurrence of these conditions over an unbroken period of four or more nights makes it very likely that late blight will appear in potatoes and/or tomatoes. Nearly 90% of the fruits in unchecked plots, in an experiment in which 40 treatments were being compared, became infected with late blight. This was reduced to 2.2% by a mixture of COC-S (basic copper chloride 2 parts, plus basic copper sulphate 1 part) plus p.e.p.s. (polyethylene polysulphide). Eight of the ten treatments that gave the greatest reduction in fruit loss contained copper in one form or another.

624. DEEMS, R. E.

Trichothecium fruit rot of glasshouse tomatoes.

*Phytopathology*, 1951, 41: 633-40, bibl. 30, illus.

A minor fruit-rot disease of tomato is caused by *Trichothecium roseum*. In nature the symptoms are generally supplemented by those caused by secondary saprophytes. Inoculation tests on other fruits show that the fungus is similar to previously reported strains.—Ohio agric. Exp. Stat. [For previous abstract see *Ibidem*, 41: 9-10; *H.A.*, 21: 2702.]

625. WILHELM, S.

Effect of various soil amendments on the inoculum potential of the *Verticillium wilt* fungus.

*Phytopathology*, 1951, 41: 684-90, bibl. 27.

A determination of the tomato infection index in

amended and non-amended portions of the same soil. [See also *Ibidem*, 40: 970; *H.A.*, 21: 678.]

626. HALL, W. C.

Morphological and physiological responses of carnation and tomato to organic phosphorus insecticides and inorganic soil phosphorus.

*Plant Physiol.*, 1951, 26: 502-24, bibl. 34, illus., being *Tech. Art. Tex. agric. Exp. Stat.* 1452.

1. Morphological, physiological, and metabolic effects produced by the organic phosphorus insecticides, hexaethyl tetraphosphate and tetraethyl pyrophosphate, were studied singly and in combination with inorganic soil P in carnation and tomato. 2. The abnormal flowering symptoms first observed in carnation were reproduced in this species by aqueous spray applications of hexaethyl tetraphosphate containing the active constituent tetraethyl pyrophosphate and the symptoms are described and illustrated. 3. Stimulatory, inhibitive, and lethal responses of tomato to TEPP were noted and the concentration ranges of TEPP necessary to produce these were reported. Formative effects, even at extremely high soil levels of superphosphate, were not produced by inorganic phosphorus applications. 4. Of the concentrations tested 400 p.p.m. of TEPP marked the upper limits of stimulation for stem elongation and time of flowering in tomato. The difference in the number of flowers produced was not considered to be significant, however, in this study. 5. Weight production and carbohydrate content decreased in treated plants. Hydrolysis of reserve carbohydrates and the accumulation of soluble sugars were accelerated by TEPP. 6. Respiratory measurements showed that 400 p.p.m. of TEPP greatly accelerated oxygen uptake (62% above the controls), but 800 p.p.m. inhibited oxygen uptake (27% of controls). 7. Phosphorus fractionation disclosed that TEPP increased soluble phosphorus at the expense of the insoluble fraction, and indicated accelerated phosphorolysis in the treated plants. 8. The elements K, P, and Ca increased in plants treated with 400 p.p.m. TEPP. These changes are interpreted to mean that a stimulation of primary absorption occurred due to the increased respiratory energy resulting from treatment. 9. The similarity in morphological and metabolic responses of plants to 2,4-D and TEPP has been noted and a common mode of action of the two compounds discussed. [Author's summary.]

627. SANFORD, G. B., AND DAVIDSON, T. R.

Effect of 2,4-dichlorophenoxyacetic acid vapour on tomato plants in a greenhouse.

*Sci. Agric.*, 1951, 31: 368-71, bibl. 3, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv. Canada Dep. Agric.* 1078.

Serious damage to tomatoes and certain other plants in a greenhouse was caused by 2,4-D fumes emanating from an adjoining room. The source of the contamination of the glasshouse air was located by germinating cucumber seeds moistened with water through which air was pumped from different parts of the building. It was found that 2,4-D was the cause, having been spilled accidentally on the wooden floor of the adjoining room. This emanated toxic fumes for about 17 months after the accident, at which time the contaminated wood was replaced.

628. ZIMMER, S. J.  
Tomato grading—machines to suit all growers.  
*Fruitgrower*, 1951, No. 2913, pp. 700-2, illus.

The Tod, Helix, Notenboom and Lea Valley types of tomato sizer are described and compared.

629. VEIGA, A. DE A.  
Práticas tecnológicas com tomates. (The technology of tomato products.)  
*Rev. Agric. Piracicaba*, 1951, 26: 163-78, bibl. 6.

This account of methods of processing tomatoes contains information on the relative value of different varieties for the manufacture of tomato purées and extracts.

630. HESTER, J. B.  
Fundamental factors influencing the composition of tomato purée.  
*Agron. J.*, 1951, 43: 400-2, bibl. 2.

Data accumulated over a period of 10 years under varying soil and climatic conditions indicate that elements like nitrogen, potassium, and magnesium and the total amount of fertilizer used influenced the quality of tomato products when used on soils deficient in these elements. [Author's summary.]—Campbell Soup Co.

# Noted.

631. a BOUSARD, M.  
Wetenswaardigheden over meloenen. (Melon growing.)  
*Cult. Hand.*, 1951, 17: 403-4, illus.
- b DENNISON, R. A., AND JANES, B. E.  
A machine for indexing the shipping and handling qualities of tomatoes.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 295-6, illus.
- c DUNN, J. A.  
Pea aphid population studies in 1950.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 21-6.
- d ELLIS, D. E.  
Noteworthy diseases of cucurbits in North Carolina in 1949 and 1950.  
*Plant Dis. Repr.*, 1951, 35: 91-3, bibl. 4.
- e FEINBRUN, N.  
Chromosome counts in Palestinian *Allium* species.  
*Palest. J. Bot. (J)*, 1950, 5: 13-16, bibl. 5, illus.  
In 10 species.
- f GOOSSENS, J.  
Een bladvlekkenziekte op jonge slaplanten veroorzaakt door *Pleospora herbarum* (Pers.) Rabenh. (A leaf spot disease of young lettuce caused by *Pleospora herbarum*.) [English summary 9 lines.]  
*Tijdschr. PlZiekt.*, 1951, 57: 170-1, illus.  
Recommendation: removal of leaves and replanting gaps.

- g HANNA, G. C., AND BAKER, G. A.  
Analysis of asparagus field trials on the basis of partial records.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 273-6.
- h HESTER, J. B., SHELTON, F. A., AND ISAACS, R. L., Jr.  
The rate and amount of plant nutrients absorbed by various vegetables.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 249-51, bibl. 4.  
The effects of varying rotations.
- i JUNE, R. I.  
Growing tomatoes for canning in Hawkes Bay.  
*N.Z. J. Agric.*, 1951, 83: 107-12, illus.
- j LINN, M. B.  
Control of smut in bulb onions by pelleting the seed with technical thiram.  
*Plant Dis. Repr.*, 1951, 35: 94-6, bibl. 4.
- k MARION, M. V., AND OTHERS.  
A portable pea viner for experimental plots.  
*Agron. J.*, 1951, 43: 403-4, illus.
- l NEPVEU, P.  
La chenille à fourreau de l'asperge (*Hypopta caestrum* Hubner) dans les aspergeraies de Vaucluse: dégâts et biologie. (The asparagus moth (*Hypopta caestrum* Hubner) in the asparagus beds of Vaucluse: the damage it causes and its biology.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 132-3, bibl. 1.
- m POUND, G. S., AND OTHERS.  
Extent of transmission of certain cabbage pathogens by seed grown in Western Washington.  
*Phytopathology*, 1951, 41: 820-8, bibl. 11, illus.
- n PROCHÁZKA, Ž., AND KOŘÍSTEK, S.  
A proof of the existence of a bound form of ascorbic acid in cabbage by paper chromatography.  
*Coll. Czech. chem. Commun.*, 1951, 16: 65-8, bibl. 9.
- o PULLIN, A. DE M., AND RUSSO, A.  
O uso do 2-4-D para a obtenção de tomates sem sementes. (The use of 2,4-D for obtaining seedless tomatoes.)  
*Rev. Agric. Piracicaba*, 1951, 26: 32-42, bibl. 6, illus.  
Satisfactory results with the sodium salt of 2,4-D at 8 p.p.m.
- p ROLAND, G.  
Étude d'une mosaïque observée sur *Apium graveolens*. (Celery mosaic.) [Dutch summary 2 lines.]  
*Parasitica*, 1951, 7: 63-8, bibl. 5, illus.  
A mosaic on young celery leaves described as *Apium virus* 1.



- q SMITH, P. G., AND HEISER, C. B., JR.  
Taxonomic and genetic studies on the cultivated peppers [chillies], *Capsicum annum* L. and *C. frutescens* L.  
*Amer. J. Bot.*, 1951, 38: 362-8, bibl. 15, illus.
- r STENUIT, D., AND PIOT, R.  
Recherches concernant l'apparition d'une coloration bleu-noirâtre des plantes, dans les forceries de chicorée-witloof. (An investigation into a dark blue discoloration of forced chicory.) [English and German summaries  $\frac{1}{2}$  p. each.]  
*Rev. Agric. Brux.*, 1951, 4: 239-56, illus.  
Opzoekingen naar de ozaak van het optreden van blauw loof bij witloofforcerie. (An investigation into a dark blue discoloration of forced chicory.)  
*Cult. Hand.*, 1951, 17: 348-52, illus.  
See also H.A., 21: 3622. The article in *Rev. Agric. Brux.* is the fullest of the three.
- s SZELUBSKY, R.  
Caryology and morphology of some Palestinian species of *Allium*.  
*Palest. J. Bot. (J)*, 1950, 5: 1-12, bibl. 9, illus.
- t TOMETORP, G.  
Sortförsök med mærg- och spritärter vid Alnarp 1943-1948. (Variety trials with round and wrinkled garden peas at Alnarp 1943-1948.) [English summary 2 pp.]  
*Medd. Trädgårdsförs. Malmö* 62, 1951, pp. 36, bibl. 36.
- u WEST, C. H.  
Tomato growing.  
*J. Dep. Agric. S. Aust.*, 1951, 54: 608-9, 612.  
In the Adelaide Hills as a sideline.
- v WHEATLEY, G. A.  
Investigations on insecticidal dusts.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 27-34.  
Use against pea aphids.
- w WINTER, E. J.  
The germination of Cheltenham greenleaved beet.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 41-2, 1 ref.  
Preliminary evidence noted.
- x WOODMAN, R. M.  
Rotation of vegetables with different manurial treatments.  
*First A.R. nat. Veg. Res. Stat. Wellesbourne* 1950, 1951, pp. 43-6.

## POTATOES.

### General.

(See also 211, 1090, 1097.)

632. DEPARTMENT OF COMMERCE AND AGRICULTURE.

#### The Australian potato industry.

*Bull. Bur. agric. Econ. Aust.* 5, 1949, pp. 67, bibl. 17 [received 1951].

Victoria and Tasmania are the most important potato producing States. In this bulletin the production and consumption in the different Australian States are dealt with in detail. Transport is considered and marketing before and during control. The future outlook and the factors influencing supply and demand are discussed together with the possibility of decreasing costs by mechanization and better transport facilities.

633. AGRICULTURAL AND ANIMAL HUSBANDRY.

#### Potato special number.

*Agric. Anim. Husb. U.P.*, 1951, Vol. 1, Suppl., pp. 62, illus., Rs. 1/4/-.

This number should encourage the growing of potatoes in the United Provinces. It contains articles on historical or nutritional aspects of the potato and in addition papers by experts of the U.P. on potato research in the U.P., delayed sprouting, breeding, diseases in the U.P., the tuber moth (*Gnorimoschema operculella*) and the potato epilachna (*Epilachna* spp.).

### Quality.

(See also 647, 649.)

634. SMITH, O.

#### Potato quality.

*Amer. Potato J.*, 1951, 28: 732-7.

Its meaning and importance from a customer's point

of view and how some of the customer's demands can be met.

635. BRAUTLECHT, C. A., AND GETCHELL, A. S.

#### The chemical composition of white potatoes.

*Amer. Potato J.*, 1951, 28: 531-50, bibl. 54.

Analytical data from the first author's laboratory at Orono, Maine, and from many published sources allow the authors to summarize as follows: "The average of starch in German potatoes is nearer 18% and maximum near 30%. Maximum starch in Maine potatoes (1934-1950) was 20%. The nitrogen-free extract in some lots was found to be about 23%. Percentages of alanine approximately 4.9; valine, 1.1; glutamic acid, 4.6; tryosine, 4.3; phenyl alanine, 3.9; proline, 3.6; leucine, 12.2; cystine, 4.4; some tryptophane; arginine, 4.2; histidine, 2.3; and lysine, 3.3."

636. KUNKEL, R., GREGORY, J., AND BINKLEY, A. M.

#### Mechanical separation of potatoes into specific gravity groups shows promise for the potato chip industry.

*Amer. Potato J.*, 1951, 28: 690-6, bibl. 15.

It was found in trials by workers at Fort Collins, Colo., that high specific gravity potatoes (mean value 1.0916) averaged almost 3.5% more saleable chips than low specific gravity potatoes (mean value 1.0777) and that the colour of the chips was preferable.

637. EDGAR, A. D.

#### Determining the specific gravity of individual potatoes.

*Amer. Potato J.*, 1951, 28: 729-30, illus.

Exact instructions with diagram and chart of a s.g. potato grader used in Colorado recently.

638. HILTON, R. J.  
The relationship between tuber texture and cooking quality in potatoes.  
*Rep. Proc. 7th annu. Mig west. Canad. Soc. Hort.*, 1951, pp. 70-2, bibl. 7.

A discussion on the relationship between the texture of potato tubers, depending on the quantity and size of starch granules, and their cooking quality. It is suggested that while the starch content remains the most outstanding texture characteristic, there might be other components affecting the texture and directly or indirectly the cooking quality of potatoes. Such factors are thought to be the deposition and nature of pectins and protopectins in the tuber, relationships between minerals and dry matter content, and the influences of tuber maturity and of respiration rate in storage upon these factors.

639. CRAFT, C. C., AND HEINZE, P. H.  
Association of specific gravity with weight of individual tubers in late crop potatoes.  
*Amer. Potato J.*, 1951, 28: 580-2, bibl. 4.

Results of trials were conflicting in the evidence produced and no practical significance, so far as concerns separating potatoes for specific gravity on the basis of weight, can be given to any of the relations found.

#### Varieties.

(See also 689a, g, j, k.)

640. RIEMAN, G. H., AND OTHERS.  
Clonal variations in the Chippewa potato variety.  
*Amer. Potato J.*, 1951, 28: 625-31, bibl. 11.

An attempt is described to determine what variation in plant character observed in the Chippewa potato variety in Northern Wisconsin is due to environment, to disease and to heredity. The authors responsible for the investigations are inclined to think that any one of these factors is responsible in certain cases and that causes other than disease may contribute to clonal variation. They consider that some of the unproductive variants are heritable and that their occasional appearance is the rule and not the exception in asexual potato propagation. Careful clonal selection is therefore essential.

641. SERVICE DE L'HORTICULTURE, MAROC.  
Compte-rendu des résultats d'un essai de 11 variétés de pommes de terres en provenance de Hollande. (Results of a trial of 11 potato varieties from Holland.)  
*Terre maroc.*, 1951, 25: 263-7, illus.

In a trial carried out at the Regional Horticultural Station, Dar Bouazza, Morocco, the value of 11 Dutch potato varieties for growing as an early crop for export was investigated, and their performance was compared with that of the standard export variety Royal Kidney. Data are presented on disease resistance, precocity, total yield, percentage of medium-sized tubers and effect of post-harvest washing. Only the varieties Ari and Sneeuw conformed to the requirements of the English market.

642. ZVEREVA, P. A.  
Frost resistant varieties of potato. [Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 6: 15-17.

It is claimed that frost-resistant, good cropping varieties of potato were obtained from the progeny of vegetative hybridization, by grafting a wild frost-resistant variety on a good-cropping non-frost-resistant variety.

643. HEY, A.  
Über die Schorfresistenz der in der DDR zugelassenen Kartoffelsorten. (The scab resistance of potato varieties which are allowed to be grown in Germany.)  
*NachrBl. disch. PflSchDienst, Berlin*, 1951, 5: 86-91, bibl. 10.

The results of 25 years of field trials by the Biologische Zentralanstalt are reviewed in the light of our recent knowledge on *Actinomyces scabies* specialization. In evaluating resistance the highest degree of infection in a variety is also taken into account.

#### Nutrition.

644. ALLBRITTEN, H. G., ODLAND, T. E., AND SALOMON, M.  
Nutrient status of soils on commercial potato producing areas of Rhode Island.  
*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 248-51, bibl. 9, being *Contr. R.I. agric. Exp. Stat.* 767.

The results of soil fertility experiments carried out on Rhode Island potato farms during 1947-49 showed that many growers were using more fertilizer per acre than was necessary, or were using the wrong grade for maximum yields. 120 lb. N per acre appeared adequate for most soil conditions in Rhode Island. The older potato soils, however, might have responded to higher N levels if the growing conditions during the period of the experiments had been more favourable. Of  $P_2O_5$  and  $K_2O$ , 180 lb. each per acre sufficed. It is recommended that on old potato soils 2,000-2,500 lb. 6-8-8 fertilizer per acre should be applied banded in the rows, while on new land low in phosphorus and potash the same amount of 5-10-10 fertilizer should be used.

645. BROWN, B. A., AND OTHERS.  
Causes of very poor growth of crops on a formerly productive soil.  
*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 240-3, bibl. 9, illus.  
HAWKINS, A., BROWN, B. A., AND RUBINS, E. J.  
Extreme case of soil toxicity to potatoes on a formerly productive soil.  
*Amer. Potato J.*, 1951, 28: 563-77, bibl. 10.

Very poor growth of potatoes was observed on a formerly productive field in Connecticut which had been cropped to potatoes for 13 consecutive years and liberally fertilized with N, P, K and Mg. The soil was found to be strongly acid (pH 5.0), very high in soluble Al and Mn, high in available P and K, low in Mg and Fe and very low in Ca. Other plants, including lettuce and tomatoes, grown in this soil did not develop

normally. The direct cause of the trouble would appear to be the toxic effects of Cu, Mn and Al under conditions of soil acidity. Of the many treatments given, any that reduced the acidity of the soil were beneficial. Heavy applications of superphosphate markedly improved the top growth of the plants but had little effect on the root growth. Both heavy liming or moderate liming plus heavy applications of superphosphate resulted in normal growth.—Conn. agric. Exp. Stat.

646. Terman, G. L., and others.

**Rate, placement and source of nitrogen for potatoes in Maine.**

*Bull. Me agric. Exp. Stat.* 490, 1951, pp. 34, bibl. 21, illus.

More than 100 field experiments, conducted chiefly during the past 21 years, involving N rate, placement and source comparisons on potatoes, are summarized in this bulletin. The more important results are as follows: Before 1946 maximum yield response was obtained with 80-120 lb. N per acre, but recent improvements in pest and disease control have resulted in an occasional response to rates up to 180 lb. per acre. Greatest yield response was always obtained from the first 40-80 lb. of N in the fertilizer. Katahdin potato yields following green manure crops have averaged 20-50 bushels higher than those following potatoes. The differences in yield caused by the previous crop, however, decreased with increasing amount of N applied. There was no advantage from split applications of fertilizer. Potato quality decreased slightly with increase in the rate of N applied, while the percentage of large and oversize tubers increased with increasing rates of N, if the total yield increased. A combination of ammonium and nitrate sources of N produced as high or higher yields than various single sources of N. There was no point in supplying organic forms, except to improve the physical condition of mixed fertilizers.

647. Russell, D.

**The influence of certain fertilizer elements on cooking quality and tuber conformation.**

*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 69-70, bibl. 11.

A high degree of mealiness, cohesiveness, a snowy white colour when cooked, and a mild flavour are the main characteristics of good cooking quality in potatoes. From the brief review of literature presented it would appear that soils receiving nitrate and phosphate fertilizers tend to produce flatter tubers which have a higher starch content than round ones, and are consequently more mealy. Boron seems to be the most important element favourably affecting coloration, cohesiveness and flavour. Other factors mentioned, influencing potato quality, include pH value of soil and irrigation.

648. BUZOVER, F. JA.

**The effect of potassium on the activity of invertase in potato leaves.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1950, 73: 1291-3.

In leaves of potato plants growing in soil cultures without added potassium the general activity of

invertase was significantly higher than in those of plants with added K, the effect increasing with increasing amounts of K. The synthetic activity of invertase, on the other hand, was greater in the leaves of plants receiving K, particularly those receiving twice the normal amount. The hydrolytic activity of invertase was highest in the leaves of plants growing without added K.

649. NOONAN, J. C., AND OTHERS.

**Influence of location on the ascorbic acid content of the Irish potato.**

*Amer. Potato J.*, 1951, 28: 521-4, bibl. 6.

Trials for 2 years at 5 places in Louisiana yielded data that indicate very strongly that there are significant differences in the vitamin C content in potato varieties but that there are even greater differences as between years and locations. In view of the growing industry in canning potatoes the investigations are being continued.

650. LEHR, J. J.

**Importance of sodium for plant nutrition: V. response of crops other than beet.**

*Soil Sci.*, 1951, 72: 157-66, bibl. 5.

In these tests with various field crops significant responses to sodium were recorded at all potassium levels in one of two varieties of potatoes and in turnips, but usually the response decreased at higher potassium levels.

651. BERNSTEIN, L., AYERS, A. D., AND WAD-LEIGH, C. H.

**The salt tolerance of White Rose potatoes.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 231-6, bibl. 13.

Potato plots received equal parts by weight of NaCl and CaCl<sub>2</sub> in irrigation water in four successive irrigations. "Low salt" plots received an eventual salt concentration of 2,000 p.p.m., "medium salt" plots received 4,000 p.p.m. and "high salt" plots 6,000 p.p.m. Yield was steadily reduced by increasing salt concentrations. Weight of tubers and tubers per hill were also reduced. Tuber specific gravity was increased by saline treatment at the early harvests, but not at the later harvest. Dry weight percentage and starch content were slightly raised by salinity while sugar percentage decreased. Determination of the mineral content of the potato plants showed increases in Ca and Cl content of the leaves, and increases in the Ca, Cl, Na and K content of the stems. A comparison is made between the mineral uptake of potatoes and beans in saline plots. C.W.S.H.

652. COÏC, Y., AND DE BAISSÉ, G.

**Manganèse et filiosité de la pomme de terre. (Manganese and spindling sprout of potato.)**

*C.R. Acad. Agric. Fr.*, 1951, 37: 278-81, bibl. 7.

From the results of analyses of normal tubers and others showing spindling sprout [*H.A.*, 17: 200; 19: 3220] it is concluded that in the cases examined the disorder could not be correlated with manganese deficiency.



*Photosynthesis.*

653. CHAPMAN, H. W.  
Absorption of CO<sub>2</sub> by leaves of the potato.  
*Amer. Potato J.*, 1951, 28: 602-15, bibl. 13.

The CO<sub>2</sub> absorption method of measuring apparent photosynthesis was found to be well adapted to use with potato leaves. Findings are recorded.

*Handling seed potatoes.*

654. HARDENBURG, E. V.  
Effect of various methods of handling seed potatoes in preparation for planting.  
*Amer. Potato J.*, 1951, 28: 525-9, bibl. 1.

Various preplanting treatments were given to potatoes in the years 1945, 1947, 1948, 1949 and 1950 and effects on subsequent performance noted. Treatments were planting fresh cut, dusting with hormones and storing, cutting and curing, green sprouting. None appeared to result in increased crop.

655. STEINECK, O.  
Der hydroponische Stecklingstest. Ergebnisse bisheriger Erfahrungen und neuerer Untersuchungen. (The development of isolated [potato] buds in water culture. Previous results and later investigations.)  
*Bodenkultur*, 1951, 5: 161-73, bibl. 11, illus.

In evaluating seed potatoes, the development of isolated buds, particularly their root system, was found a reliable criterion. A water culture technique, by which quick results were obtained, was described in an earlier communication [see *H.A.*, 20: 1729]. In further developing this method it was found that by altering the ratio of the nutrient components in the solution, chiefly by reducing N content, an earlier appearance of leaf roll symptoms was obtained. Thiocarbamide was very effective in breaking the dormancy of the tubers and allowed trials to be started 2-3 days after harvest. The sectional boxes used for raising isolated buds in moist sand were both time- and labour-saving and experiments have shown individual pots to be more satisfactory than tanks for observing the development of the plant in water culture.

656. CLAVER, F. K.  
Influencia de luz, oscuridad y temperatura sobre la incubación de la papa. (The effect of light, darkness and temperature on the incubation of seed potatoes.) [English summary ½ p.]  
*Phyton*, 1951, 1: 1: 3-12, bibl. 3.

Experiments were carried out on the potato variety Katahdin under controlled conditions of light and temperature to determine the effect of these factors on the length of the incubation period (the period between sprouting and tuber formation). The results indicated that light is not necessary for incubation. Continuous light prolonged the incubation period compared with a natural photoperiod (10 hours light per day). The light treatment most favourable for incubation was a natural photoperiod for 17 days followed by continuous darkness. The most favourable temperature range was 15.2-18.7° C.—Univ. nac. La Plata, Argentina.

657. SYMON, J. A., AND OTHERS.  
Storage and dressing of seed potatoes.  
*Adv. Leaf. Dep. Agric. Scotland* 19, 1951, pp. 10, illus.

To avoid waste in store and ensure delivery of seed in good condition careful attention to detail is necessary. Points dealt with here cover precautions before lifting, e.g. killing haulms; lifting—avoid bruising and treat against dry rot if necessary; pit and shed storage—aeration; dressing the seed—discarding damaged potatoes, avoiding frost injury; sprouting in storage sheds; diseases causing wet or dry rots and skin diseases.

658. EMILSSON, B., AND GUSTAFSSON, N.  
Behandling av utsädespotatis med gröningshämmande medel. (Treating seed potatoes with sprout inhibiting chemicals.) [English summary ½ p.]  
*J. roy. Swedish Acad. Agric.*, 1951, 90: 245-56, bibl. 12.

In preliminary trials at Nynäshamn, Sweden,  $\alpha$ -naphthaleneacetic acid methyl ester was found unsuitable for the treatment of seed potatoes to inhibit sprouting. In more comprehensive experiments with 4 varieties, treatments with tetrachloronitrobenzene did not cause any significant delay in development, reduction in stand or depression of yield, provided the tubers were green sprouted or exposed to air for a sufficiently long time before planting. It is pointed out, however, that the advantages which may be gained by treating seed potatoes are relatively small under Swedish conditions. [From authors' summary.]

659. WITTEWIT, S. H., AND PATERSON, D. R.  
Inhibition of sprouting and reduction of storage losses in onions, potatoes, sugar beets, and vegetable root crops by spraying plants in the field with maleic hydrazide.  
*Quart. Bull. Mich. agric. Exp. Stat.*, 1951, 34: 3-8, bibl. 5, illus.

Foliage sprays of 2,500 p.p.m. (0.25%) of maleic hydrazide, with the addition of a wetting agent, completely inhibited sprouting in stored onions when applied 1 to 2 weeks before harvest, in potatoes 2 to 6 weeks before harvest and in root vegetables (carrot, beet, parsnip, turnip, rutabaga) 1 to 3 weeks before harvest. Lower, 500 to 1,000 p.p.m., concentrations were found effective in delaying and reducing sprouting. Maleic hydrazide has been shown to be more effective when applied to the leaves of growing crops than to relatively dormant bulbs, tubers or roots after harvest. Preharvest foliar treatments also have the advantage that the food product is only treated indirectly.

660. KENNEDY, E. J., AND SMITH, O.  
Response of the potato to field application of maleic hydrazide.  
*Amer. Potato J.*, 1951, 28: 701-12, bibl. 6.

In tests at Ithaca, N.Y., with maleic hydrazide used to inhibit sprouting the general conclusion reached was that the application of it at a high concentration (0.1%) early in the growing season caused plant injury but that if the application was made later it resulted in a reduction of sprouting in store.

661. ALLEN, H. T.  
Effects of various synthetic hormones on potato plants and tubers.  
*Rep. Proc. 7th annu. Mtg west. Canad. Soc. Hort.*, 1951, pp. 72-3, 100-1, bibl. 19.

Synthetic hormones are used as sprout inhibitors either in storage or applied in the field, and for breaking dormancy. [The references given in this review were taken for the greater part, 13 out of 19, from *Horticultural Abstracts*.]

### Cultivation practices.

(See also 689i.)

662. MACLACHLAN, D. S., AND RICHARDSON, L. T.  
The rapidity of vine-killing by herbicides in relation to internal tuber discoloration in potatoes.  
*Amer. Potato J.*, 1951, 28: 687-9.

Dowspray 66 Improved killed potato haulms more quickly than two other herbicides tested. The incidence of stem-end discoloration varied inversely with the number of days needed to kill the plant and there was a marked decrease in amount of internal discoloration after the tubers had been stored for 4 months, when this spray was used.

663. VAN LOY, L. G.  
Quelques arracheuses-ensacheuses de pommes de terre de construction belge. (Some potato lifting and bagging machines constructed in Belgium.) [English and German summaries  $\frac{1}{2}$  p. each.]  
*Rev. Agric. Brux.*, 1951, 4: 3-38, illus.

Some of the problems involved in the mechanical lifting and bagging of potatoes are discussed, and 4 types of lifter constructed in Belgium are described in detail and illustrated diagrammatically.

664. ISBELL, C. L.  
Effect of grabbling on yield of potatoes.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 214-16, illus.

"Grabbling" is the digging up of potatoes for current consumption without disturbing the rest of the plant and before the plants have matured. It is a common practice among Southern farmers. An experiment showed that the total yield was not reduced by "grabbling"  $1\frac{1}{2}$  lb. of potatoes from  $\frac{1}{4}$ th acre plots twice a week for 8 weeks.

C.W.S.H.

### Storage.

(See also 479.)

665. S., K.  
Kartoffeleinlagerung in Kisten. (Storing potatoes in crates.)  
*Neue Mitt. Landw.*, 1950, No. 27, from abstr. in *Rev. Agric. Brux.*, 1950, 3: 1098-9.

A method is described of storing potatoes in wooden, slatted crates, weighing 30-32 kg. when full, which, it is claimed, reduces losses during storage and prevents premature sprouting. A case is cited where its use resulted in a loss of only 12 kg. out of a total of 22,500 kg.

666. PAYNE, M. G., AND OTHERS.  
The effect of storage on color and sprouting of Red McClure potatoes after 2,4-D treatment.  
*Amer. Potato J.*, 1951, 28: 455-64, bibl. 12.

The intensified red skin colour of Red McClure potatoes, produced by treating growing plants with the sodium salt of 2,4-D at rates of  $\frac{1}{2}$  and 1 lb. per acre, persisted throughout a 6-month storage period. Sprouts formed on the potatoes in question were more numerous but individually of less weight than those of untreated tubers. No significant difference was found in growth or yield of desprouted planted tubers from treated and untreated plants.

667. WHITTENBERGER, R. T.  
Changes in specific gravity, starch content, and sloughing of potatoes during storage.  
*Amer. Potato J.*, 1951, 28: 738-47, bibl. 9.

Observations on the specific gravity:sloughing relationship under different temperature conditions in store.

### Virus diseases.

(See also 689e.)

668. M'INTOSH, T. P.  
Healthy seed potatoes.  
*Scot. Agric.*, 1951, 31: 99-104.

The article introduced by a brief history of "curl"—a name applied to what are now known to be virus diseases—describes recent developments in Scotland under the following headings: Methods of building up healthy stocks; the virus-tested inspection scheme and the technique of raising virus-tested stocks; testing plants for virus-freedom; testing for virus-X; and advantages of virus-tested stocks.

669. BAUMEISTER, B.  
Wuchs- und Hemmstoffe in der Knolle und im Kraut gesunder und abbaukranker Kartoffelpflanzen. (Growth- and growth-inhibiting substances in the tubers and foliage of healthy and virus diseased potatoes.)  
*Planta*, 1951, 38: 683-741, bibl. 34.

Detailed results of investigations, carried out in 1947 and 1948 in Münster, Western Germany, on the growth substance content of both tubers and foliage of potatoes are given. It is shown that the ratio of growth inhibiting substances was higher in virus diseased plants, and that the total growth substance+growth inhibiting substance content was reduced by the presence of virus infection.

670. WILSON, J. H.  
The expression of symptoms of leaf-roll virus in potatoes.  
*Ann. appl. Biol.*, 1951, 38: 546-7.

High nitrogen, in the presence of phosphorus, masked leaf-roll symptoms and the extent of this reaction differed in different potato varieties, being more pronounced in Up-to-Date than in Craig's Defiance. Shading had a slight masking effect, but potassium intensified the symptoms. These reactions are considered to be of importance in relation to seed certification.

C.W.S.H.

671. BAWDEN, F. C., AND KASSANIS, B.  
Serologically related strains of potato virus Y that are not mutually antagonistic in plants.

*Ann. appl. Biol.*, 1951, 38: 402-10, bibl. 10.

Hitherto potato virus Y strains were found to be serologically related and mutually antagonistic, i.e. a plant infected with one strain resisted another. The work described has shown that, although tobacco vein necrosis virus (TVNV) is serologically related to potato virus Y strains Y1 and PVC (potato virus C), its presence does not protect tobacco, *Nicotiana glutinosa*, or potato plants against these strains of virus Y, or vice versa. Nevertheless tobacco vein necrosis is considered to be a strain of virus Y, since serological relationship is of greater import than mutual antagonism, which is not understood. Strain TVNV is more virulent towards tobacco than towards the potato.

C.W.S.H.

672. BROADBENT, L., AND TINSLEY, T. W.  
Experiments on the colonization of potato plants by apterous and alate aphids in relation to the spread of virus diseases.

*Ann. appl. Biol.*, 1951, 38: 411-24, bibl. 9.

Experiments were carried out in which potato plants in pots, some of which were surrounded by sticky boards, were placed alongside plants infected with potato virus Y and leaf roll virus. The presence of boards hardly affected the spread of these diseases, showing that the plants were infected largely by winged aphids. Wingless aphids were thought to be responsible only for spreading the viruses throughout a hill, and perhaps to neighbouring hills where leaves touch, though these hills will probably have been already infected by the winged aphids.

C.W.S.H.

673. HAINE, \*E.

Zur Frage der Überwinterung von *Myzodes persicae* Sulz. an Sekundärwirten: II. *Myzodes persicae* Sulz. und andere an Kartoffeln vorkommende Aphiden in den Gewächshäusern von Bonn. (The overwintering of *Myzodes persicae* on secondary host plants: II. *Myzodes persicae* and other aphids occurring on potato in the glasshouses of Bonn.)

Reprinted from *Anz. Schädlingssk.*, 1951, 24: 97-105, bibl. 31.

Alternate hosts, mainly ornamental pot plants, of *M. persicae*, *Neomyzus circumflexus*, *Aulacorthum pseudosolani*, *Macrosiphon solanifolii*, *Myzus ornatus*, *Doralis frangulae* and *D. fabae* are listed. Regular, weekly to fortnightly application of E605 sprays and fumigation with a proprietary fumigant were found effective in controlling the aphids in the greenhouses.

### Bacterial and fungous diseases.

674. STARR, G. H.  
Some factors influencing infection by *Corynebacterium sepedonicum* in potato plants.

*Amer. Potato J.*, 1951, 28: 551-8, bibl. 13.

An observation of immediate practical value was that when seed-pieces were cut directly through one or more eyes with a contaminated knife the subsequent symptoms were more prevalent and severe than those caused by cutting similar tubers between the eyes.

675. WENZL, H.  
Untersuchungen über die *Colletotrichum*-Welkekrankheit der Kartoffel. I. Schadensbedeutung, Symptome und Krankheitsablauf. (Studies of potato *Colletotrichum*-wilt disease. I. Symptoms, progress and effects.) [English summary ½ p.] *PflSch. Ber. Wien*, 1950, 5: 305-44, bibl. 84, illus.

The symptoms and effects of this disease are described in detail, and, contrary to earlier views, it is stated that the roots are primarily affected. After the death of the roots lack of water absorption produces the characteristic wilting in tubers and stems. The symptoms, as observed in Austria, Czechoslovakia and Hungary, correspond to those of the black spot disease, partially caused by *Colletotrichum atramentarium*, prevalent in France. Wound parasitism on the base of the stems was not found to have any connexion with the disease, nor had the appearance of *Colletotrichum* spots on the tubers, these being more numerous on non-wilted tubers.

676. WENZL, H.  
Untersuchungen über die *Colletotrichum*-Welkekrankheit der Kartoffel. II. Die Hydratur welkekranker Knollen. (Studies of potato *Colletotrichum*-wilt disease. II. Water content in wilt diseased tubers.) [English summary ½ p.] *PflSch. Ber. Wien*, 1951, 6: 33-57, bibl. 9.

The symptoms of wilt disease were artificially induced in tubers by removal of water through shoot transpiration and prevention of replenishment through the roots. Soft, discoloured, wilted potatoes showed a loss of 25% to 30% water and corresponding increase in dry substance. Non-wilted tubers from wilt diseased plants had an abnormally low starch content associated with the destruction of the connecting stolon. It was observed that the tissues of wilt diseased plants showed a marked increase in the concentration of solids in the cell sap, only partly accounted for by the loss of water.

677. WENZL, H.  
Untersuchungen über die *Colletotrichum*-Welkekrankheit der Kartoffel. III. Pflanzgut- und Futterwert welkekranker Kartoffeln. (Studies of potato *Colletotrichum*-wilt disease. III. Seed and fodder value of wilt diseased potatoes.) [English summary ½ p.] *PflSch. Ber. Wien*, 1951, 6: 97-112, bibl. 9.

Tubers from wilt diseased plants showed a high incidence of hair sprouting, although susceptibility to both wilt and hair sprouting varied with variety. Sprouting of wilt affected plants was uncertain and irregular; tubers therefore should not be used for seed except after careful selection from those already sprouted. Affected tubers were not harmful to animals and could be fed, but not stored because of their tendency towards premature rot.

678. HÜTTENBACH, H.  
Echter Mehltau auf Kartoffeln und Gurken. (Powdery mildew on potatoes and cucumbers.) *NachrBl. dtsh. PflSch. Dienst.*, Braunschweig, 1951, 3: 98-100, bibl. 4, illus.



*Insect and eelworm pests.*

(See also 689d, 1, n, 712.)

683. DUNN, E.  
Wing coloration as a means of determining the age of the colorado beetle (*Leptinotarsa decemlineata* Say.).  
*Ann. appl. Biol.*, 1951, 38: 433-4, bibl. 2, illus.

A series of colour photographs illustrates the changes which occur in the coloration of the wings of the colorado beetle as it grows older. C.W.S.H.

684. MINISTRY OF AGRICULTURE, LONDON.  
Potato root eelworm [*Heterodera rostochiensis* Woll. *schachtii* Schm.].  
*Adv. Leaflet. Minist. Agric. Lond.* 284, 1951, pp. 5, illus.

Heavy manuring helps plants to "grow away" and crop well. Otherwise the advice is given to avoid having potatoes more than once in 4 or, better, 5 years on the same ground and to leave no stray tubers in the ground in the meantime. Steam sterilization remains the most effective control when the eelworm attacks tomatoes under glass.

685. STONE, L. E. W.  
Potato root eelworm under glass in Somerset.  
*Agriculture, Lond.*, 1951, 58: 391-4, bibl. 2.

A survey of 51 holdings in 1948/49 and 54 other nurseries in 1949/50 in Somerset showed that although greater yields followed the use of DD [dichloropropane + dichloropropylene] a considerable increase in total populations of eelworm also resulted. Its use is not recommended.

*Pest and disease control substances.*

686. SELLKE, K.  
Die Einwirkung des Hexachlorcyclohexans auf die Pflanzen und auf den Geschmack von Erntegut. (The action of BHC on plants and its influence on flavour.)  
*NachrBl. dtsh. PflSchDienst, Berlin*, 1951, 5: 41-6, bibl. 14.

The findings of a tasting panel on off-flavour in several potato varieties following application of BHC are discussed and statistically evaluated. It is concluded that the use of the purified  $\gamma$ -isomer does not necessarily prevent the occurrence of off-flavours, especially in the case of an overdose. This is probably not due to impurities but to the effect which the compound has on the metabolism of the plant. The literature on the subject is briefly reviewed.—*Biol. Zentralanst., Berlin*.

687. ANDRADE, A. C., AND MOREIRA SALLES, J.  
Comparação entre o polvilhamento e a pulverização da batatinha cultivada na estação seca. (A comparison between spraying and dusting potatoes in the dry season.)  
*Biológico*, 1951, 17: 115-22, bibl. 1.

The trials were carried out on 3 commercial potato crops in Brazil, dithane, parzate, perenox and a copper oxychloride preparation being used in dust and spray form in comparison with bordeaux mixture. Though somewhat contradictory, the results indicated that all

Powdery mildew was found on the potato variety Ackersegen in a glasshouse at Bonn after mildew infected cucumbers and beetroots had been grown in the same house. A discussion on the identity of the causal fungus ends with the suggestion that the fungus most likely to be responsible was that which causes powdery mildew on cucumber, *Erysiphe cichoracearum*.

679. MINISTRY OF AGRICULTURE, LONDON.  
Dry rot of potatoes [*Fusarium* spp.].  
*Adv. Leaflet. Minist. Agric. Lond.* 218, 1951, pp. 5, illus.

Control measures advocated and described are: careful handling so as not to damage, and chemical disinfection by dipping in an organo-mercury disinfectant immediately after lifting.

680. ANON.  
Phytophthora-vrije aardappelen. (Blight-resistant potatoes.)  
*Nieuwe Veldbode*, 1950, No. 40, from abstr. in *Rev. Agric. Brux.*, 1950, 3: 990.

An account of the work carried out over the last 7 years at Hoofddorp, Holland, on the breeding of blight resistant potatoes, and of some of the results so far obtained.

681. CASTRONOVO, A.  
Fuentes de resistencia a *Phytophthora infestans*. (Sources of resistance to *Phytophthora infestans*.)  
*Rev. Invest. agric. B. Aires*, 1950, 4: 245-75, bibl. 58, illus., being *Publ. Inst. Fitotec. Minist. Agric. B. Aires* 82.

During the period 1946-49 an extensive collection of potatoes was tested at the Instituto de Fitotecnia for resistance to potato blight. None of the commercial varieties, forms of *S. tuberosum* obtained from south Chile, or forms of *S. andigenum* showed a high degree of resistance. Of the wild species tested, resistance was shown by *S. "Aya-papa"*, *S. cardiphyllum*, *S. demissum*, *S. semi-demissum* and *S. verrucosum*. Of the seedlings obtained from other research stations, resistance was shown by 843 c (29), 914 a (12), S.96-28, C.Z.K-7, D.C.R-1 and D.H.B-6. The study has shown that the population of *Phytophthora infestans* in Argentina is different from that in other countries, and is more virulent, for many species or varieties considered resistant in other countries proved susceptible in these tests. It appears probable that different physiological races of the fungus exist in Argentina.

682. HOPF, M.  
Untersuchung an Kartoffelknollen über eine Beeinflussung ihrer *Phytophthora infestans*-Resistenz durch Insektizide. (The influence of insecticides on blight resistance in potato tubers.)  
*NachrBl. dtsh. PflSchDienst, Berlin*, 1951, 5: 74-5, bibl. 3.

An overdose of DDT, BHC and phosphoric acid esters was found to lower the blight resistance of potato plants in the following season. Tubers of two varieties and three strains of *Phytophthora infestans* were used in these tests. Data are presented, but no attempt at a physiological interpretation is made, in view of our scanty knowledge on the translocation of insecticides and their accumulation in the tuber.

the 4 newer fungicides resulted in better yields than bordeaux, that spraying and dusting gave equally good results when applied adequately, and that the addition of the insecticide Rhodiatox to the fungicides in most cases increased yields.

688. DE ROJAS PEÑA, E.  
Descripción preliminar de las alteraciones causadas en la papa por aspersiones con bordeaux mixture. (Preliminary description of the morphological effects of bordeaux mixture on potato plants.)  
*Agric. trop. Bogotá*, 1950, 6: 10: 53-4, illus.

In a comparative trial of 6 fungicides on potatoes, carried out at the Potato Experimental Station, Usme, Cundinamarca, the following morphological characters were observed exclusively on the plants given weekly applications of bordeaux mixture: A general dwarfing of the leaves; atrophied, narrow leaflets with a corrugated surface and fluted edges and a large, hairy midrib which caused the leaflets to curl; chlorotic markings which could be seen when the leaves were held against the light. Microscopic examination showed the cells of the chlorotic areas to be longer and narrower than those of healthy tissue. The tissues of the midrib were necrotic, as were those of the base of the hairs and those surrounding the chlorotic areas. There were fewer stomata than on healthy leaves.

# Noted.

689.  
a ANON.  
New potato varieties released.  
*Amer. Potato J.*, 1951, 28: 697-99.  
Canso and Keswick both highly resistant to late blight.  
b BARKER, J.  
A note on the determination of alcohol in potato tubers.  
*J. exp. Bot.*, 1951, 2: 238-41, bibl. 4.  
c BECKMANN, C. O., AND ROGER, M.  
The question of the branching enzyme in potatoes.  
*J. biol. Chem.*, 1951, 190: 467-80, bibl. 22.  
d BÉGUÉ, H.  
Nouvelles études sur les produits antidoryphoriques. (Comparing results of preparations for the control of colorado beetle.)  
*Ann. Épiphyt.*, 1946, 12: 209-44 [received 1951].

- e BRAKKE, M. K., BLACK, L. M., AND WYCKOFF, R. W. G.  
The sedimentation rate of potato yellow-dwarf virus.  
*Amer. J. Bot.*, 1951, 38: 332-42, bibl. 15, illus.  
f CAMPBELL, J. C. (EDITOR).  
*American Potato Yearbook 1951*.  
319 Scotch Plains Avenue, Westfield, N.J., 1951, pp. 80.  
g DEPARTMENT OF AGRICULTURE FOR SCOTLAND.  
*Key to potato trials and collections at East Craigs 1951*.  
H.M.S.O., Edinburgh, 1951, pp. 50, 1s. 6d.  
h DONALDSON, R. B., AND MCFEELY, H. F.  
Grade requirements for Pennsylvania potatoes.  
*Circ. Pa agric. Ext. Serv.* 383, 1951, pp. 8, illus.  
i GEORLETTE, R.  
Destruction des fanes de pommes de terre. (Destruction of potato haulms.)  
*Ann. Gembl.*, 1951, 57: 157-60, bibl. 22.  
Haulm destruction, advantages and methods.  
j HAWKES, J. G.  
The Commonwealth Potato Collection.  
*Amer. Potato J.*, 1951, 28: 465-71, bibl. 8.  
k LIVERMORE, J. R.  
The Canoga potato.  
*Amer. Potato J.*, 1951, 28: 672-4.  
l LLOYD, N. C.  
Control of potato moth—promising results with DDT.  
*Agric. Gaz. N.S.W.*, 1951, 62: 237-40.  
m PARKS, N. M.  
How to select and prepare potatoes for exhibit.  
[Publ.] *Canada Dep. Agric., Div. Hort.*, [1951 ?], pp. 11, illus.  
n THIEM, E.  
Untersuchungen über die Giftempfindlichkeit der Kartoffelkäferlarven in Abhängigkeit vom Entwicklungszustand. (The influence of developmental stage on the susceptibility of colorado beetle larvae to insecticides.)  
*NachrBl. deutsch. PflSchDienst, Berlin*, 1951, 5: 8-12, bibl. 8.

# TOBACCO.

## Research reports.

690. TOBACCO RESEARCH STATION, MOTUEKA.  
Tobacco research.  
*A.R. Tobacco Res. Stat. Motueka 1950-51*, 1951, pp. 3.

An account is given, without exact data, of progress in tobacco investigations at Motueka [in the South Island of New Zealand]. They comprise seedling bed investigations, fertilizer and cultural trials, variety

trials and seed production, curing, breeding and control of diseases.

In seedling beds steam proved the best method of weed control. Hormone treatment at planting out had no effect. Watering at intervals of several days proved better than daily watering. The benefit of including 2% magnesium in the fertilizer was apparent in growth. The addition of 5 lb. borax per acre resulted in brighter and better textured leaf. Other trials concerned rotation and spacing. Breeding for resistance to

black root rot and to Verticillium wilt continues. These two diseases as well as mosaic and canker are under observation. Pests were not serious, but springtails caused damage to seedlings for the first time at Motueka. The effect of particular fertilizers and of spacing and topping on composition of leaf is being observed. The chemistry of curing is under examination.

691. LAUMONT, P.

La Station Expérimentale Agricole d'Isserville. (Isserville Agricultural Experimental Station.)

[*Publ. Algeria*, undated], pp. 15, bibl. 2, illus. [received 1951].

This Station was established in 1932 in the tobacco growing region of Kabylie, Algeria, for the purpose of improving local varieties of tobacco, testing introduced varieties, distributing pure, healthy seed and investigating problems of tobacco culture and drying. Its achievements up to date are briefly summarized. [See also *H.A.*, 17: 2319.]

### Varieties.

(See also 714b.)

692. RETIEF, D. F.

Tobacco production: climatic requirements and areas of cultivation.

*Fmg S. Afr.*, 1951, 26: 148, 158.

With a change in production from Amarelo to Orinoco types there would appear to be a better chance of selling South African tobacco overseas. The districts most suitable for the production of Virginian tobacco are in the northern, central and eastern Transvaal, the south-western and eastern districts of the Cape Province and the coastal regions of Natal. The climate is tropical or sub-tropical and the altitude usually below 4,000 ft.

693. BENNETT, R. R., HAWKS, S. N., Jr., AND GARRISS, H. R.

Tobacco varieties in North Carolina.

*Ext. Circ. N.C. St. Coll.* 302, revised 1951, pp. 19.

A practical bulletin giving the following information on some 46 varieties or selections: origin, suitability for particular soil types, fertility levels and localities, resistance to disease, growth characteristics, average sucker production, harvesting and curing characteristics. It is noted that in general the broad leaf varieties produce a higher yield and value per acre and the highest yield of thin, bright cigarette tobacco compared with narrow leaf varieties. It is recommended that varieties with wide spacing between the leaves and with rounded or moderately short leaves should be spaced closer in the field than those with closely spaced and long leaves.

### Cultivation and nutrition.

(See also 714a, f, 1063, 1086, 1089, 1092, 1108, 1109, 1112.)

694. SUMMERVILLE, W. A. T.

Contributions of agricultural research in crops.—5. Warm climate crops.

*J. Aust. Inst. agric. Sci.*, 1951, 17: 85-9.

*Tobacco*: The havoc caused by the seed harvesting ant

was overcome by sand top-dressing. Blue-mould in the seedbed was controlled by vapour treatment. Agronomic and manurial problems have been undertaken in all tobacco growing districts. Varietal work has consisted of the testing of imported strains and, more recently, breeding for quality and mosaic disease resistance. Flue curing has replaced sun and air curing, and this has resulted in extension of tobacco growing areas and changes in the varieties grown. Grading has recently received greater attention. *Sugar cane*: Sugar cane work is under the control of the Bureau of Sugar Experiment Stations. Research work has been followed by legislative action for the control of certain diseases. Downy mildew and gumming disease have been eradicated. Plant breeding work has been most successful and 60% of the canes produced are now from Queensland-bred varieties. Cane grubs and wireworms have been controlled by benzene hexachloride. Optimum fertilizer dressings for each soil type have been determined. C.W.S.H.

695. ALLAN, J. M.

Tobacco seed-beds; their construction and management.

*J. Agric. W. Aust.*, 1951, 28: 83-96, illus.

Under the cold, wet conditions in the lower south-west of Western Australia during late winter and early spring, it would be impossible to have seedlings ready for planting out at the right time unless seedbeds were protected from the ill effects of inclement weather and disease. The only satisfactory way of securing protection is by growing the seedlings in properly constructed, covered seedbeds, well managed and treated with benzol to prevent disease. Advice is given on (1) area of seedbed necessary, (2) preparation of seedbed site, (3) construction of seedbeds, (4) soil preparation, (5) sowing the seed, (6) management of seedbed, (7) control of downy mildew (blue mould), (8) control of insect pests, and (9) transplanting. Downy mildew [*Peronospora tabacina*] is the most serious disease affecting tobacco in Western Australia. The use of benzol in seedbeds ensures absolute control.

696. ČIRKOVSKIĖ, V. I.

Data on the rest period of tobacco seeds.

[Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80:

465-7, bibl. 1.

The germination capacity of tomato seed was tested when fresh and when stored at different temperatures and at three degrees of relative humidity for one to several months. Generally there was an increase in germination capacity during the early months of storage, followed, after about three months storage, by a decrease (rest period), then, later, by a further increase. With seeds stored at 30° C. and 60% relative humidity the rest period was absent. Two-year-old seeds held at 18° C. and at low relative humidity (over crystallized NaOH), or at 60%, showed no rest period.

697. KINCAID, R. R.

Management of cigar-wrapper tobacco plant beds.

*A.R. Fla agric. Exp. Stat. for 1949-50*, pp. 220-1.

In the fifth year of an experiment still in progress



cyanamid alone gave the best weed control, but combination with uramon gave the highest yields of early plants. Fumigation, especially with dowfume W-40, gave increased yields when used in connexion with weed control treatments. Dithane Z-78 (10% in pyrophyllite) showed better control of downy mildew (blue mould) than did ferimate (20%).

698. MOSELEY, J. M., HARLAN, W. R., AND HANMER, H. R.

Burley tobacco. Relation of the nitrogenous fractions to smoking quality.

*Industr. Engng Chem.*, 1951, 43: 2343-7, bibl. 21.

The authors correlate leaf composition with recognized standards of quality. The method of evaluation described "is being employed as a guide in the development of new and improved varieties of Burley tobacco".

699. REISENAUER, H. M., AND COLWELL, W. E. Some factors affecting the absorption of chlorine by tobacco.

*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 222-9, bibl. 11, illus., being *Contr. Dep. Agron. N.C. agric. Exp. Stat., J. Ser.* 360.

It had been observed that tobacco grown as the first crop on recently cleared land absorbed greater quantities of chlorine than that grown on soils cultivated for several years. Field and greenhouse studies on factors affecting the uptake of chlorine by tobacco gave the following results. (1) A more dilute chlorine solution was displaced from the virgin soils than from the cultivated soils. Moisture holding capacity and evaporation losses were greater in the virgin soils. Calculations show that wide differences in the chlorine content of virgin and cultivated soils might occur when a dry period of 1 week was followed by a moderately heavy rain. (2) Chlorine content of tobacco leaves was inversely related to soil pH. (3) Additions of Ca reduced chlorine content of leaf tissue. (4) Uptake of chlorine and concentration of this element in the leaves increased in an almost linear manner with increasing chlorine applications up to the level of toxicity. (5) The influence of N, P, K, Ca, S and Mg on chlorine uptake is reported. (6) When all factors favouring low absorption were combined in one greenhouse treatment, the chlorine content of the leaves was reduced to about one-third that resulting from a combination of all factors favouring high absorption at a constant chlorine level. Individual effects appeared to be additive.

700. BORBOLLA Y ALCALÁ, J. M. R. de la, AND CORTÉS MUÑOZ, V.

Sobre la determinación de calcio y magnesio en el tabaco, sin previa mineralización. (The determination of calcium and magnesium in tobacco, without previous mineralization.) [English summary 5 lines.]

*An. Edaf. Fis. veg. Madrid*, 1951, 10: 287-90, bibl. 5.

A comparative study was made of 3 methods of extraction for the determination of Ca and Mg in fermented tobacco leaves, viz. incineration, mineralization and direct extraction from the powdered leaves with dilute HCl. The results obtained by the 3 methods agreed fairly well and the last method was by far the most rapid.—Inst. Tobacco Biology, Seville.

701. VAN EMDEN, J. H.

Doornloze *Mimosa*. (A thornless mimosa.)

*Bergcultures*, 1951, 20: 201, bibl. 1, illus.

*Mimosa invisa* is a valuable green manure and cover crop, much used by the Deli tobacco growers, but its use is limited by its sharp thorns. A thornless variety has now been discovered which, at the C.P.V. Experiment Station, Bogor, was found to breed true to type.

### Diseases.

(See also 714d, j.)

702. BAWDEN, F. C., AND PIRIE, N. W.

Some factors affecting the activation of virus preparations made from tobacco leaves infected with a tobacco necrosis virus.

*J. gen. Microbiol.*, 1950, 4: 464-81, bibl. 24.

Preparations made quickly from freshly expressed sap were less infective than those made from sap that had been frozen and allowed to age for a few days. The extent of the activation produced by these treatments depended on the physiological condition of the infected leaves.—Rothamsted Experimental Station.

703. BAWDEN, F. C., AND PIRIE, N. W.

Some effects of freezing in the leaf, and of citrate *in vitro*, on the infectivity of a tobacco necrosis virus.

*J. gen. Microbiol.*, 1951, 4: 482-92, bibl. 9.

Freezing minced leaves or expressed sap does not destroy infectivity. The infectivity, but not the serological activity, of the virus is lost on exposure to 0.02-0.01M neutral citrate.—Rothamsted Experimental Station.

704. TIRELLI, M.

Contributo alla conoscenza delle enazioni del tabacco. (Facts known on enation in the tobacco plant.)

*Tabacco*, 1951, 55: 179-210, bibl. 41, illus.

A discussion of published literature on enation in tobacco is followed by the author's observations on leaves of Virginia bright tobacco, which he describes in detail. The enations observed were cup-shaped and were disposed symmetrically round the median leaf vein, half way between it and the edge of the leaf. Certain histological features were noted, e.g. the pronounced thinness of the edge of the leaf at the base of the enation, the presence of palisade tissue in the enations and its modifications in certain points of the enation itself. The leaves showed no symptoms of disease. This particular phenomenon is compared with those reported by other workers, and Donadoni's observations of very different manifestations linked with enation are discussed. The author, who intends to continue his studies of the phenomena, concludes that enation may be considered as a phenomenon which obeys two types of stimulus, namely internal and external.

705. LUCARDIE, M.

Remming van de vermeerdering van tabaks-mozaiekvirus door een extract van de kernen van enkele palmsorten. (Inhibition of the multiplication of tobacco mosaic virus by an extract of the kernels of some species of palms.) [English summary 9 lines.]

*Tijdschr. PlZiekt.*, 1951, 57: 172-3.

Extracts of the kernels of *Acrocomia totai* and *Elais* sp., when sprayed on tobacco plants, inhibited the multiplication of tobacco mosaic virus, the local lesions developing on treated plants being fewer than those on plants sprayed with water only.

706. TAKAHASHI, W. N.

A comparison of methods for extracting tobacco mosaic virus from leaf tissue.

*Phytopathology*, 1951, 41: 903-7, bibl. 6.

Three general methods of extracting tobacco mosaic virus from leaf tissues, described and compared, are the extraction of the virus from (1) coarse macerate of frozen tissue, (2) homogenate of frozen tissue, and (3) enzyme digest of leaf residue. The highest yield, 10-18 mg. per gram fresh weight of tissue, was obtained by the enzyme digest method using crop enzymes of snail at pH 6.0.—Univ. of Calif.

707. TERNOVSKIĖ, M. F.

Resistance to powdery mildew in vegetative hybrids of tobacco. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 437, bibl. 7.

The author describes his results with vegetative hybrids obtained from grafting varieties of tomato susceptible to powdery mildew (*Erysiphe cichoracearum*) onto immune varieties. He finds that the number of immune strains in the segregated families from vegetative hybrids is less than in sexual propagation, but in the oldest generations there is a tendency for the number to increase. Forms that show constant immunity in the fourth and fifth generations maintain this constancy in succeeding generations.

### Insect pests and nematodes.

708. RHOADES, W. C.

Control of green peach aphid on cigar-wrap-per tobacco.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 220.

Combinations of 1% parathion with 2.5% and 5% aldrin, 2.5% and 5% dieldrin, 10% DDD, and 5% DDT plus 10% toxaphene and of 1.5% metacide with 5% DDT plus 10% toxaphene gave outstanding control of the three most important insects affecting shade-grown tobacco, i.e. green peach aphid, *Myzus persicae*; tobacco budworm, *Heliothis virescens*; and tobacco hornworm, *Protoparce sexta*. The chemicals were applied as dusts at 10-day intervals throughout the growing season.

709. WOODRUFF, N.

Control of cutworms and aphids on tobacco.

*J. econ. Ent.*, 1951, 44: 322-4, bibl. 1.

Thirty pounds of 10% toxaphene dust or 10% chlordane dust per acre applied to the surface of the soil at least a week before planting gave excellent control of cutworms on tobacco. Toxaphene emulsion, at the same rate of active ingredient per acre, was equally effective. Chlordane, applied in the setting water at the rate of 4 oz. per 50 gal., and 30 lb. of 10% DDT dust per acre showed poor control of cutworms throughout the season. DDT dust, parathion dust and spray, and combinations of both were very effective in controlling aphids when applied on tobacco as preventive treatments before heavy infestation occurs. A wettable

DDT spray powder gave poor control of aphids. [Author's summary.]—Conn. agric. Exp. Stat.

710. ANDERSON, P. J.

Control of tobacco nematodes by soil fumigation.

Abstr. in *Phytopathology*, 1951, 41: 657.

Two kinds of nematode affect Connecticut Valley tobacco: the rootknot nematode (*Heterodera marioni*) and the brown root-rot or meadow nematode group (*Pratylenchus pratensis* and others). Experiments have shown that both can be controlled by fumigating the fields with ethylene dibromide or DD.

711. ANON.

Pests destroyed by electrocution.

*Fruitgrower*, 1951, No. 2906, p. 380.

A brief note taken from the South African Farmer's Weekly on the possibility of controlling soil pests, which damage tobacco in Southern Rhodesia, by electricity. In preliminary laboratory trials the destruction of knot eelworm of tobacco, by means of high frequency electric current applied through suitable electrodes to the soil, appeared promising. In field tests, spacing electrodes at 24 in. distance resulted in 71% of eelworm-free plants as against 17% in the control plots.

712. PERUCCI, E.

Osservazioni sulla dorifora delle patate (*Leptinotarsa decemlineata*). (Notes on the relation of the Colorado beetle to tobacco.)

*Tabacco*, 1951, 55: 127-33.

In experiments at the Cerea Tobacco Trial grounds the Colorado beetle was found to attack *Nicotiana glauca*, an ornamental tobacco variety, but never the cultivated varieties of tobacco or paprika and only very slightly and insignificantly in early stages the tomato.

### Curing.

(See also 714c.)

713. GIOVANNOZZI, M., AND VERDURA, R.

Studi sulla cura dei tabacchi. IV. Nota. Sull'impiego dei raggi infrarossi per il riessiccamento dei tabacchi. (Tobacco curing. 4. Infra-red rays for final drying (redrying).)

*Tabacco*, 1951, 55: 89-94, bibl. 8.

Infra-red drying was compared at Salerno with air drying, coke drying, and coke and superheated steam drying. Coke drying alone resulted in the highest loss of tobacco dry matter and the use of infra-red rays the lowest. A new and promising technique is emerging.

### Noted.

714.

a ANON.

Le tabac en A.E.F. (Tobacco culture in French Equatorial Africa.)

*Rev. int. Tabacs*, 1951, 26: 217: 31-4, 46, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 243.

Development and future.

- b BOLSUNOV, L.  
Étude des formes tétraploïdes chez les tabacs, *Nicotiana rustica* L. et de leur valeur économique. (A study of the tetraploid forms of *Nicotiana rustica* and their economic value.)  
*Rev. int. Tabacs*, 1951, 26: 216: 19-20, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 175.
- c FREY-WYSSLING, A.  
La modification chimique du tabac au cours du séchage et de la fermentation. (Chemical modification of tobacco during drying and fermentation.)  
*Rev. int. Tabacs*, 1951, 26: 216: 12-13, bibl., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 243.  
Experimental methods and data.
- d FULTON, R. W.  
Superinfection by strains of tobacco mosaic virus.  
*Phytopathology*, 1951, 41: 579-91, bibl. 16, illus.  
See abstract *Ibidem* 41: 13; *H.A.*, 21: 2769.
- e LAUMONT, P.  
L'organisation coopérative de la production du tabac à fumer en Kabylie. (The co-operative organization for tobacco production in Kabylie.)  
Reprinted from *Rev. int. Tabacs*, 1949, No. 194, pp. 4, bibl. 2 [received 1951].
- f STANICHEVSKY, S.  
La culture du tabac en Union soviétique. (Tobacco culture in the Soviet Union.)  
*Rev. int. Tabacs*, 1950, 25: 232-3, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 111.  
Especially in Crimea, Kuban, Bessarabia and Transcaucasia.
- g SUPICO, J. L.  
Le tabac dans les colonies portugaises. (Tobacco culture in the Portuguese colonies.)  
*Rev. int. Tabacs*, 1951, 26: 216: 14-16, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 175.
- h TOLNAY, P.  
Détermination de la teneur en chlorophylle de la feuille de tabac. (Determination of chlorophyll in the tobacco leaf.)  
*Rev. int. Tabacs*, 1951, 26: 216: 9-11, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 205.
- i WANROOY, G. L.  
Verleden, heden en toekomst van de tabakscultuur in Indonesië. (Tobacco culture in Indonesia: past, present and future.)  
*Indonesië*, 1951, 4: 357-75, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 175.
- j WEBER, P. V. V.  
Inheritance of a necrotic-lesion reaction to a mild strain of tobacco mosaic virus.  
*Phytopathology*, 1951, 41: 593-609, bibl. 17, illus.

## MISCELLANEOUS TEMPERATE AND TROPICAL CROPS

(See also 1057, 1074, 1076.)

*Aromatics, spices, condiments.*

(See also 964, 965.)

715. LAUMONT, P.  
Notes sur quelques plantes de "petite culture" intéressantes pour l'Algérie: (médicinales, pharmaceutiques, condimentaires, tinctoriales). (Notes on some minor crops of interest in Algeria (drugs, condiments and dyes).)  
*Bull. Insp. gén. Agric. Algér.* 158, 1950, pp. 64, bibl. 24.

One list is given of some of the minor crops that have been grown in Algeria for the production of condiments, drugs, perfumes, tannins or dyes, and another of the crops that it might be possible to grow there. These are followed by notes on the cultivation, uses and economic possibilities of 10 of these crops, for which there would now seem to be a market, viz. *Pimpinella anisum*, *Peumus boldus*, *Anthemis nobilis*, *Cuminum cyminum*, *Punica granatum*, *Lawsonia inermis*, *Mentha* spp., *Papaver* spp., *Pyrethrum cinerariaefolium*, *Glycyrrhiza glabra*, *Crocus sativus* and *Lippia citriodora*.

716. DECOBERT, E.  
Le poivre. (Pepper.)  
*Marchés Col. du Monde*, 1951, 7: 655-6, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 246.

A survey of pepper production, with particular reference to botany, varieties and production in the French colonies.

717. CARRÉ, M.  
L'avenir de la pipéiculture dans la péninsule indochinoise. (The future of pepper culture in Indochina.)  
*Bull. Econ. Indochine*, 1950, 53: 295-320, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 246.

World production of pepper, importing countries, prices and the economics of pepper culture in South Indochina are dealt with, and investigations on cultivation methods and pests and diseases are reviewed. The possibilities of improving production are discussed.

718. SUBBIAH, M. S.  
Certain preliminary studies in the control of cardamom thrips.  
*Indian Fmg*, 1950, 11: 183-7.

The life cycle of the cardamom thrips, *Elettaria cardamomum*, is completed in 35-40 days. Experiments showed that monthly applications of insecticide were more effective than alternate monthly applications. The most effective insecticides were nicotine sulphate spray and Gammexane D 025 dust, the use of which caused increased yields over control of more than 300%. The increased yield obtained amply repaid the



cost of the insecticides and their application. Gam-mexane is preferred to nicotine sulphate, since it is readily available and more convenient to use.

C.W.S.H.

**Bactericidal, insecticidal and similar plants.**

719. BUSHNELL, O. A., FUKUDA, M., AND MAKINODAN, T.

The antibacterial properties of some plants found in Hawaii.

*Pacif. Sci.*, 1950, 4: 167-83, from abstr. in *Landbouw*, 1951, 23: 121-2.

The antibacterial properties of the sap from various parts of about 100 plants were tested.

720. JARAMILLO MADARIAGA, G.

Propiedades insecticidas de la semilla del mamey. (The insecticidal properties of mamey seeds.)

*Agric. trop. Bogotá*, 1950, 6: 11: 29-31.

Results of experiments carried out at the National Faculty of Agronomy, Medellín, have shown that an infusion of the powdered fresh seeds of mamey (*Mammea americana*) in water gives very effective control of lice and fleas on animals and humans and is quite safe to use. Sliced seeds dried at 80-100° C. and then powdered killed the little ant by contact more rapidly than a derris powder containing 3-47% rotenone. The active principle of the seed is a resin which loses its toxicity on extraction; the powder, however, retains its insecticidal properties indefinitely. [See also *H.A.*, 20: 2656.]

721. BEROZA, M.

Alkaloids from *Tripterygium wilfordii* Hook. —wilforine and wilfordine.

*J. Amer. chem. Soc.*, 1951, 73: 3656-9, bibl. 17.

The compounds are insecticidally active ester alkaloids. —Bureau of Entomology and Plant Quarantine, U.S. Dep. Agric.

722. FERROUX, J.

Le pyrèthre. (Pyrethrum.)

[*Publ. Inst. agric. Algérie* ?, undated], pp. 17, bibl. 69 [received 1951].

A review of the cultural requirements of *Pyrethrum cinerariaefolium* and of the economic possibilities of growing the crop on a large scale in Algeria.

723. ANON.

Une sérieuse reprise dans la culture du pyrèthre au Kivu. (An important revival of pyrethrum culture in Kivu.)

*Congopresse*, 1950, 78: 1586, Dutch text p. 1595, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 71.

Pyrethrum culture was started in Kivu in 1931, more than 2,600 ha. being then planted. Production has increased continuously and in 1949 about 650 tons were produced.

724. LING, L.

On the occurrence of *Colletotrichum derridis* in Taiwan.

*Plant Dis. Repr.*, 1951, 35: 13-15, bibl. 3, illus.

This disease has become established in the island of

Taiwan (Formosa) wherever *Derris elliptica* is grown. It affects leaves, petioles, and stems of both young and mature plants. Initial infection appears on the upper surface of the leaves as minute, brownish specks, which, under humid conditions, enlarge rapidly and sometimes coalesce. Selection of disease-free cuttings, together with field sanitation, offers the best control. The removal and burning of infected plants and debris reduce sources of secondary inoculum.—United Nations Food and Agriculture Organization.

725. HÄRDTL, H.

Über die Wirkung des Senföls auf Tier und Pflanze. (The action of mustard oil on animals and plants.)

*NachrBl. dtsh. PflSchDienst, Berlin*, 1951, 5: 91-4, bibl. 19.

Mustard oil is shown to be an effective fumigant for certain storage products and to have some fungistatic action. The irritation it causes to man makes its application less hazardous than that of HCN. The oil is produced from *Brassica nigra* seed.

**Drug plants.**

(See also 957-963.)

726. HEGNAUER, R.

De alkaloiddevorming door de plant. (Alkaloid production by plants.)

*Pharm. Wbl.*, 1950, 85: 937-50, bibl., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 49.

A review of the literature and preliminary results of an investigation into the synthesis of alkaloids by *Datura stramonium*.

727. TRUSZKOWSKA, W.

Badania nad mykotrofizmem oraz zawartością glukozydów u trzech gat. *Digitalis* z naturalnych i sztucznych stanowisk. (Investigations into mycotrophism and glucoside content of three species of *Digitalis* growing wild and cultivated.) [French summary 1 p.] *Ann. Univ. Mariae Curie-Skłodowska*, 1950, 5, Sect. C, pp. 279-305, bibl. 43.

The results of ash analysis, biological analysis of frogs, soil analysis and anatomical and cytological analysis of the roots show that there is no morphological difference between wild and cultivated specimens, that cultivated specimens have a higher mineral content, and that *Digitalis ambigua*, *purpurea* and *lutea*—the species tested—generally but not always have endotrophic mycorrhizas. All mycorrhiza found were cytologically identical. Lack of adequate material made it impossible to confirm any correlation between mycorrhiza and glucoside content in the leaves. Environmental acidity has no influence on mycotrophism in *Digitalis*. The trials show that differences in toxic element content in the different species are very small, which explains why *D. ambigua*, the commonest species in Poland, can be used for drug production.

728. ROSS, D. J.

The chemistry of corymbiferin, a pigment derived from a glucoside occurring in *Gentiana corymbifera* T. Kirk.

*N.Z. J. Sci. Tech., Sec. B*, 1950, 32: 3: 39-43, bibl. 4.

A pigment, corymbiferin, of molecular formula  $C_{18}H_{12}O_7$ , has been isolated from the roots of *Gentiana corymbifera*.

729. DATTA, A., AND DATTA, S. C.

Pharmacognostic investigations on *Lobelia pyramidalis* Vahl.—a substitute for *Lobelia inflata* Linn.

*J. sci. industr. Res. India*, 1951, **10B**: 218-23, bibl. 10, illus.

Analysis of dried *Lobelia pyramidalis* showed that the dried leaves and flowering tops contain 0.29 to 0.38% lobeline. Detailed morphological descriptions are given of the plant.

730. HANDA, K. L., AND OTHERS.

Chemical investigation of *Physochlaina praealta* Miers.

*J. sci. industr. Res. India*, 1951, **10B**: 182-3, bibl. 3.

Workers at the Drug Research Laboratory, Jammu Tawi, report that the dried leaves of *Physochlaina praealta* contain 1.02% of total alkaloids, 80% of which is hyoscyamine. They suggest that the plant, which is cultivated in Egypt and the Sudan and grows wild in the Ladakh Valley of Kashmir, could be exploited commercially in India.

731. SALMON, M. R., SMITH, E., AND BYWATER, W. G.

The glycosides of the seeds of *Strophanthus intermedius* Pax.

*J. Amer. chem. Soc.*, 1951, **73**: 3824-6, bibl. 11.

The seeds of *Strophanthus intermedius* were found to contain two crystalline cardioactive glycosides, one of them being a glycoside of sarverogenin.

732. DURHAM, O. C.

The pollen harvest.

*Econ. Bot.*, 1951, **5**: 211-54, bibl. 25, illus.

Large amounts of pollen of many plant species are collected annually in the United States. Most of it is used in preparing pollen extracts as a preventive inoculum against hay fever and pollen asthma. A description is given of methods of collecting, transportation, cleaning and drying and preparation of the extracts. Pollens of cultivated crops other than cereals and meadow grasses are rarely needed; plants forming the main source of supply are enumerated.

733. HRZANOVSKIĬ, V. G.

Is there any correlation between the characters of the calyx and the accumulation of vitamin C in roses? [Russian.]

*Bot. Zhurnal*, 1951, **36**: 529-32, bibl. 12.

A critical review of the literature on the structure of the calyx and of the geographical distribution of *Rosa* spp. in relation to vitamin content. The author concludes that the differences in vitamin C content are not related to the geographical origin of the *Rosa* spp.

#### Essential oils.

(See also 770a-c, j.)

734. ANON.

Lemongrassöl. (Lemongrass oil.)

*Ber. Schimmel and Co., Leipzig* 1949, 1950, pp. 62-4, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, **6**: 113.

Deals with prices, production and export figures for India, Madagascar and Tanganyika, the estimated area under production in Indonesia and composition of the oil from Tanganyika and Brazil.

735. ANON.

Vetiveröl. (Vetiver oil.)

*Ber. Schimmel and Co., Leipzig* 1949, 1950, pp. 120-1, from abstr. in *DocumBl. trop.*

*Prod. Amst.*, 1951, **6**: 77.

1939/45 production figures are given for Réunion, together with notes on the cultivation of vetiver in India.

#### Fibres.

(See also 928, 929.)

736. REMUSSI, C.

Las plantas textiles en la Argentina. (The fibre plants of Argentina.)

*Rev. argent. Agron. B. Aires*, 1951, **18**: 154-70, bibl. 14.

Notes are given on the problems and possibilities of industrial development of the most important fibre plants of Argentina, including ramie, New Zealand hemp, agave, indigenous Bromeliaceae, and the palm *Trithrinax campestris*.

737. GAUTIER, J.

Une étape de la mise au point du décortiquage de quelques plantes à fibres douces. (A step towards perfection in decorticating soft fibres.)

*Coton Fibr. trop.*, 1950, **5**: 163-4, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, **6**: 145.

A description is given of a simple machine for decorticating soft fibres, constructed at the N'Kenke Research Station, Equatorial Africa.

738. RABÉCHAULT, H., AND LOURD, J.

La chanvre-ortie *Laportea canadensis* (L.) Gaud. (*Laportea canadensis*.)

*Coton Fibr. trop.*, 1950, **5**: 165-88, bibl., illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, **6**: 145.

The potentialities of *Laportea canadensis* as a fibre plant are discussed. Its morphology and anatomy are dealt with, and the fibre is compared with that of ramie.

739. DE MENEZES, O. B.

Tratamento do caroá (*Neoglaziovia variegata* Mez.) pela colchicina. (Colchicine treatment of *Neoglaziovia variegata*.) [English summary  $\frac{3}{4}$  p.]

*Rev. Agric. Piracicaba*, 1951, **26**: 185-92, bibl. 12.

The caroá, *Neoglaziovia variegata*, grows wild in great abundance in the hinterland of N.E. Brazil. The plant produces a fibre which is used especially for cord making. A study of the effect of colchicine treatment of the seeds on the size of the leaf stomata indicated that colchicine treatment induced polyploidy in this species.

740. DAVID, P. A.  
A progress report on decortication and degumming of ramie, *Boehmeria nivea* (Linn.) Gaudich.  
*Philipp. Agric.*, 1950, 34: 59-60 [received 1951].  
Ramie fibres, after decortication by machine, were found to be heavily incrustated with gum. By means of setting in slowly running water for 50-100 hours before decortication, less gumming and cleaner fibre were produced. Soap solutions, rice washings and other ferments are being tried for degumming and their effect on tensile strength is being determined.  
C.W.S.H.
741. ANON.  
Nieuwe ramie-industrie. (A new ramie industry.)  
*Fin. Dagbl.*, 3 Jan., 1951, p. 3, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 74.  
There are plans to establish a ramie industry in the Netherlands, using a new degumming process.
742. MANGENOT, G., AND RAISON, M. [translated by DE GRUY, I. V., AND TRIPP, V. W.].  
Microscopical studies on the swelling of native, bleached and nitrated cellulose fibers.\*  
*Bot. Rev.*, 1951, 17: 555-628, bibl. 3½ pp., illus.  
The work was conducted mainly on cotton fibres, but it also included ramie (*Boehmeria nivea*) and grass fibres.
743. VAN LEEUWEN, A.  
De mogelijkheden van het gebruik van ramie (*Boehmeria nivea*) als veevoeder. (The possibility of utilizing ramie as cattle fodder.) [Indonesian and English summaries ¾ p. each.]  
*Landbouw*, 1951, 23: 61-85, bibl. 5, illus., also in *Hemera Zoa Dl.*, 1951, Vol. 58, No. 4.  
The cultivation of ramie as a fibre crop in Indonesia is reviewed, and an investigation into the possibility of using the tops and leaves as green fodder is reported. Data on the production per ha., composition and feeding value of tops and leaves indicate that the cultivation of ramie on large dairy farms, as a combined fibre and fodder crop, has considerable possibilities.—*Gen. Inst. Animal Husbandry*, Bogor.
744. MEDINA, J. C., AND INFORZATO, R.  
Propagação do sisal a partir de fôlhas de bulbilhos. (The propagation of sisal by means of leaves from the bulbils.) [English summary 7 lines.]  
*Bragantia*, 1950, 10: 33-4, illus.  
An experiment at the Instituto Agrônômico, Campinas, showed that it was possible to propagate sisal (*Agave sisalana*) by means of the outer leaves of the bulbils formed on the inflorescences. Such leaves rooted within a month when the lower ends were placed in water or nutrient solution. When the rooted leaves
- were transplanted into pots of rich soil they formed buds which developed into normal plants. Although the leaves of the mother plants were spineless, some of the offspring had spiny and some spineless leaves. A rooted leaf which was left in water for 16 months without being transplanted remained alive but did not form an apical bud.
745. SELLERS, W. F.  
The limitations of biological control of the sisal weevil.  
*E. Afr. agric. J.*, 1951, 16: 175-7.  
The sisal weevil, *Scyphophorus acupunctatus*, has been recorded on a large number of *Agave* species in many parts of the world. Although there had been no previous suggestion that useful enemies of the weevil could be found, a search was made in the south-western United States and northern Mexico. No parasites were found. It was suggested that the Yucatan peninsula, where there are sisal and henequen plantations, might be a more fruitful area to search.  
C.W.S.H.
- Fodder crops.**
746. CORBET, H. A.  
Fodder trees.  
[Publ.] Imperial Printing Co. Pty Ltd., Perth, W.A., 1951, pp. 16, annotated bibliography 21, 1s. 9d. Aust.  
In this interesting bulletin the author pleads for a wider use of fodder trees. He lists 44 species, for the value of which as fodder trees evidence has been adduced, and he gives notes on each.
747. COOK, P. M.  
Chemical engineering problems in large scale culture of algae.  
*Industr. Engng Chem.*, 1951, 43: 2385-9, bibl. 5, illus.  
In the development of a process to culture algae on a large scale for the possible production of feed, many chemical engineering problems must be solved. Research at the Stanford Research Institute using the organism *Chlorella pyrenoidosa* has resulted in the development on a laboratory scale of a continuous process for growing algae. The design divides the process into two primary parts: the culture farm and the processing plant. In the culture farm, where the growth takes place, a continuous system constantly maintains optimum conditions by supplying fresh medium and continually harvesting the algae. In the process plant the harvest is separated from the spent medium and dried. [From author's summary.]
- Gums.**
748. HIRST, E. L., AND JONES, J. K. N.  
Chemistry of the plant gums.  
*Research, Lond.*, 1951, 4: 411-17, bibl. 26.  
The subject is dealt with under the headings: occurrence and nature of plant gums; chemical examination of gums; structure of gum arabic; structure of other plant gums. [See also *Endeavour*, 1951, 10: 106, noted *H.A.*, 21: 3831h.]



*Gutta-percha.*

## 749. BRAAK, H. R.

Winning en bereiding van guttapercha op de landsonderneming "Tjipetir" (Pusat Perkebunan Negara). (The extraction and preparation of gutta-percha on the Tjipetir estate, Indonesia.)

*Bergcultures*, 1951, 20: 79-84, illus.

Gutta-percha is the dried latex obtained from species of the Sapotaceae native to the Malayan archipelago. The first samples were collected in the early seventeenth century, but it was only in 1845 that its value was recognized and it was used as an insulator for undersea telegraph cables. In 1883 a plantation was established at Tjipetir, Java, for purposes of study and to ensure a supply of latex. The species *Palaquium oblongifolium*, *P. gutta*, *P. borneense*, *P. treubii* and *Payena leerii* were planted, but the last two were soon discarded owing to the inferior quality of their latex. At first the latex was extracted from the trunks, but it was soon found more satisfactory to extract it mechanically from the leaves. The trees are therefore now grown in bush form and pruned every 2 years, the prunings providing 80% of the crop. The rest of the crop is obtained by plucking the oldest leaves every 6-10 weeks. The average yield is about 7,000 kg./ha./year, with a gutta-percha content of about 6% of the dry matter. An account is given of the mechanical preparation of gutta-percha, which in a purified form is now used as a covering for golf balls.

*Hops.*

(See also 211, 1047, 1092.)

## 750. ADAMSON, N. J.

Hop production in New Zealand.

*N.Z. J. Agric.*, 1951, 83: 45-8, illus.

In the Nelson district of New Zealand the climate is usually favourable for hops, which are mostly grown in association with other forms of farming, such as fruit, tobacco, dairying, sheep, and general mixed farming. There are very few farms where hop-growing is the sole occupation. Information is given on selection of site, harvesting, drying and baling, production, government assistance, and research work.

## 751. [CAWTHRON INSTITUTE (?)]

*Hop research*. Joint work of Cawthron and Government Officers, 1951, pp. 2.

Early work on hop growing in New Zealand has included a survey of the fertility status of hop gardens and manurial trials at Wai-iti and Motueka. Boron deficiency has been determined in the Nelson districts and the best methods of making this good are being investigated. Black root rot caused by *Phytophthora* sp. has been identified and there are indications that this can be prevented by soil treatment before planting with chloropicrin or D-D. The roots of Californian and Greenbine hops were excavated to a depth of 4 ft. 6 in. and examined. Hop drying tests are in progress.

## 752. LUYCKX, E.

La culture du houblon en Belgique. (Hop growing in Belgium.) [English and German summaries  $\frac{1}{2}$  p. each.]

*Rev. Agric. Brux.*, 1951, 4: 451-62.

The area under hops in Belgium has gradually decreased from 4,185 ha. in 1880 to 431 ha. in 1949. This is due to the slow progress in cultural technique which has made hop growing unprofitable. The quality of Belgian hops, moreover, is considered second rate, and in the brewing industry home-grown hops have to be mixed with better quality imported ones. Prices, consumption, imports and exports during recent years are reviewed. It is concluded that in order to establish Belgian hop growing on a profitable basis the old varieties must be replaced by selected varieties, and cultural, harvesting and drying practices must be improved.

## 753. ANON.

Lupulo (*Humulus lupulus* L.). (Hops.)

*BoI. Estac. exp. Cinco Saltos*, 1951, 3: 11-12.

Hops have been grown experimentally in Cipolletti and Cinco Saltos, Argentina, for 3 years with very promising results. About 16 ha. are now grown in the Valley of the Rio Negro where the soils and climate are considered favourable. Brief recommendations are made concerning culture. The plants should be irrigated every 8 days at first, and every 15 days later. In the first year a yield of about 400 kg. dried cones may be expected, and in the second year from 500 to 1,300 kg.

## 754. SIMOENS, U.

Le Centre d'Essai Houblonnier à Poperinge en 1950. (The Hop Experiment Station, Poperinge, in 1950.) [English and German summaries 6 lines each.]

*Rev. Agric. Brux.*, 1951, 4: 682-7.

The work of the station is briefly outlined, and some of the results obtained in 1950 on the yield and composition of selected clones of the varieties Hallertau, Tettang and Fuggles, and on the composition of some new varieties under trial, are tabulated.

## 755. VERBELEN, J.-J.

Situation actuelle de la construction des tourailles à houblon. (The present position concerning the construction of oast houses.) [English and German summaries  $\frac{1}{2}$  p. each.]

*Rev. Agric. Brux.*, 1951, 4: 985-99, illus.

A comparison is made between the composition of green and dry hops, and the chief causes of losses during the drying process are discussed. The controllable factors which affect composition during drying are humidity, temperature, draught and handling of the hops.

## 756. RICHARDSON, L. T., AND MACLACHLAN, D. S.

The control of downy mildew of hops in eastern Ontario.

*Sci. Agric.*, 1951, 31: 345-8, bibl. 3, being *Contr. Div. Bot. Plant Path., Sci. Serv. Canada Dep. Agric.* 1079.

In trials at the Illustration Station, Fournier, Ont., spraying was found superior to dusting for the control of downy mildew, *Pseudoperonospora humuli*, on hops and the best results were obtained with copper fungicides. Bordeaux 10-10-100 or 10-5-100, and C.O.C.S. and Cuprocide 54-Y, were very satisfactory, particularly with the addition of a spreader-sticker. It is recommended that hops should be sprayed at 10-day

intervals in wet weather or 2-week intervals when it is dry, from the time the vines are 6 to 8 ft. high (about 5 June) until the cones begin to form (about 1 August). f powdery mildew, *Sphaerotheca humuli*, appears hereafter, sulphur dust should be applied.

757. ZATTLER, F.

Versuche mit Systox und anderen innertherapeutischen Mitteln gegen rote Spinnmilben und Blattläuse bei Hopfen. (Trials with Systox and other systemic insecticides against red spider mites and aphids of hops.) *Höfchen Briefe*, 1951, 4: 131-69, bibl. 30, illus.

In 1950 comparative laboratory and field trials were conducted in Bavaria with "Systox" (systemics 8169) manufactured by Bayer, Leverkusen, which contains 50% E 1059 as active ingredient, "Ompa" (octa methyl pyrophosphoryltetramide) of Pest Control, Great Britain, and to a limited extent with preparation No. 8224 (Bayer). All three insecticides applied as sprays gave very satisfactory results against red spider mites on hops, *Epitetranychus althaeae*, though from the detailed results presented Systox appears to have certain advantages over Ompa, while the results obtained with preparation 8224 are only preliminary. Against the hop aphid, *Phorodon humuli*, very low concentrations of Systox, 0.005% and Ompa, 0.075%, gave excellent results. No damage was caused to plants, flowers or cones by any of the insecticides used, and examinations for toxicity and taste contamination of both hops and beer were very encouraging.

*Paper pulp plants.*

758. DAVID, P. A.

Canton and Pacol, two promising sources of pulp for the manufacture of Kraft paper and newsprint in the Philippines.

*Philipp. Agric.*, 1950, 34: 54-8, bibl. 3 [received 1951].

An account is given of two *Musa* species, Canton, *Musa cantoni*, and Pacol, *Musa errans*, which, although they are valueless as sources of cordage fibre, are nevertheless promising sources of cellulose and pulp materials for Kraft paper and newsprint, and will thrive and outgrow troublesome weeds on soils unsuited to *Musa textilis*. Canton and Pacol produce harvestable stalks yielding about 2% cleaned fibre and 5% dry pulp and fibre 20 months after planting. They are not attacked by mosaic or bunchy-top disease and appear to be free from attack by serious pests. C.W.S.H.

*Rubber plants.*

759. OZEROV, G. V., AND PAVLOV, A. N.

The after-effect of low temperatures on the growth of guayule plants growing under varying soil moisture conditions. [Russian.] *Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 597-600, bibl. 2, illus.

A high percentage of badly damaged and dead plants occurred, after freezing, in guayule grown in soil with 70% and particularly with 30% soil moisture. Plants grown at 50% soil moisture showed greater

resistance to low temperature than those grown at 70% and 30% moisture.

760. TAYLOR, K. W.

Guayule—an American source of rubber.

*Econ. Bot.*, 1951, 5: 255-73, bibl. 8, illus.

Guayule, *Parthenium argentatum*, a plant of the desert areas of Texas and Mexico, is the most promising rubber producer that can be grown successfully in the continental U.S. It is estimated that full utilization of 3,000,000 acres of marginal farm land with the use of present strains would produce 200,000 tons of natural rubber a year, while improved breeding and research could raise this to 300,000 tons. Hybrids between guayule and closely related species, particularly *P. stramonium*, show great promise in the improvement work now in progress.

761. ANON.

Argentina; producción de caucho vegetal y sintético. (Production of natural and synthetic rubber in Argentina.)

*Bol. inf. Minist. Agric.*, España, 1950, 3: 23: 78-80, from abstr. in *DocumBl. trop.*

*Prod. Amst.*, 1951, 6: 277.

Notes are given on the trial plantings of guayule (*Parthenium argentatum*), *Taraxacum kok-saghyz* and *Cryptostegia grandiflora*. In 1949 a yield of 700-1,000 kg. per ha. was obtained from the guayule plantings. The quantity and quality of latex obtained from *Cryptostegia* was good.

762. BARANOVSKIĬ, P. M.

The change in the composition of the latex in the roots of kok-saghyz in relation to mineral fertilizers. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 76: 583-6, bibl. 9.

In plants of kok-saghyz receiving N and P fertilizers the latex contains significantly more dry matter than that in others not so treated. The molecular weight of the caoutchouc of fertilized kok-saghyz is higher than that in control plants, and with P it is higher than with N, a fact probably connected with the rate of the biological ripening of the plants. There is a direct relationship between molecular weight and size of caoutchouc globules.

763. ČEREMISINOV, N. A.

Powdery mildew of kok-saghyz. [Russian.]

*Bot. Zhurnal*, 1951, 36: 72-7, bibl. 12, illus.

A powdery mildew of kok-saghyz is described under the name of *Sphaerotheca fuliginea* Poll. forma *kok-saghyzi*. It is compared with other powdery mildews on *Taraxacum*.

764. ČEREMISINOV, N. A.

Mičurin's teaching—the basis of measures for the control of the diseases of kok-saghyz. [Russian.]

*Priroda*, 1951, 40: 6: 30-8, bibl. 15.

This article is in four sections with the titles, (1) Distribution of, and the damage caused by, the diseases of kok-saghyz. (2) Mičurin's teaching—the basis of measures [selection and breeding] for the control of the diseases of kok-saghyz. (3) Breeding—the chief means of obtaining healthy kok-saghyz. (4) Agro-technical methods of increasing resistance to disease in kok-saghyz.

765. PROKOFIEV, A. A., AND RJABOV, F. P.  
The relation between the size of caoutchouc globules of kok-saghyz latex and their stability. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1950, 75: 303-6, bibl. 6, illus.

Tests were made of the effect of acetic acid, salts, auto-coagulation, and freezing on kok-saghyz latex. In all cases of partial coagulation, whatever the reagent, the largest globules (carrying the best quality caoutchouc) begin first. Thus each partial coagulation of latex not only reduces the caoutchouc content but also lowers the quality of the remaining latex.

### Seed oils.

(See also 770g, 1.)

766. ANON.  
Nieuwe drogende olie. (A new drying oil.)  
*Oliën, Vetten en Oliezaden*, 1951, 35: 2: 19, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 117.

The seeds of *Tetracarpidium conophorum* contain a drying oil that is better than linseed oil. Experimental plantings of *Tetracarpidium* in Nigeria have been successful.

767. DE MENEZES, O. B.  
O broto axilar da inflorescência na polinização artificial da mamoneira. (The role of the axillary buds of the inflorescence in the artificial pollination of castor bean.) [English summary  $\frac{1}{2}$  p.]  
*Rev. Agric. Piracicaba*, 1951, 26: 239-46, bibl. 1, illus.

In the artificial pollination of the castor bean it is usual to remove the bud in the axil of the inflorescence to facilitate clipping on the bags. The results of an experiment showed that removal of the axillary bud reduced the number of capsules set per inflorescence by causing the death of many flower buds. It is suggested that this may be a hormonal effect. It was also found that bagged inflorescences set less fruit than unbagged ones and that grey bags were less detrimental than yellow or violet ones.

### Sugar maple.

768. MARVIN, J. W., AND GREENE, M. T.  
Temperature-induced sap flow in excised stems of acer.  
*Plant Physiol.*, 1951, 26: 565-80, bibl. 24, illus., being J. Ser. Pap. Vt agric. Exp. Stat. 14.

1. A method has been developed to measure the flow of sap from small maple stems under controlled temperatures. 2. There is great variation in the quantity of sap produced under uniform temperature conditions from similar stems [of *Acer saccharum*], or even from sections of the same stem. 3. A second flow of sap may be obtained by a second temperature elevation after the first flow following freezing. This fact indicates that a freeze before each flow is not necessary. 4. Flows are produced by stems perfused with sap from other trees or with a sucrose solution. 5. Absorption occurs when the stems are perfused with distilled water or a mannitol solution isosmotic with

the sucrose content of normal sap. 6. Thermal changes in a physical system alone are not sufficient to account for the flows observed. 7. Living tissues are necessary for the flow mechanism to function. [Authors' summary.]

### Tannin plants.

769. BOGDANOV, P. A.  
Badan as a source of tannins. [Russian.]  
*Priroda*, 1951, No. 10, pp. 60-1, illus.  
Badan, *Bergenia* [*Saxifraga*] *crassifolia*, found naturally in various wooded regions of the S.S.S.R. is cultivated for its high tannin content. All parts of the plant contain tannin, particularly the rhizomes which contain 25% of their dry weight as tannins; the leaves contain up to 20%. The plant can be propagated from seed or from pieces of rhizome.

### Noted.

770.  
a ANON.  
Pflanzenphysiologisches. (On the plant physiology [of essential oil synthesis].)  
*Ber. Schimmel and Co., Leipzig 1949*, 1950, pp. 157-63, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 113.  
A summary of published results with various crops.  
b ANON.  
Nelkenblätteröl und Nelkenöl. (Cloveleaf oil and clove oil.)  
*Ber. Schimmel and Co., Leipzig 1949*, 1950, pp. 76-7, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 79.  
Production and composition.  
c ANON.  
An unusual industry in a Western Australian setting.  
*Austr. Exp.*, 1950, 6: 1: 27, 50, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 47.  
Distillation of essential oils by a firm in West Perth.  
d ANON.  
Oel von *Eugenia haitiensis*. (Oil from *Eugenia haitiensis*.)  
*Ber. Schimmel and Co., Leipzig 1949*, 1950, p. 37, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 114.  
The 1,8-cineol content and its insecticidal properties.  
e ANON.  
La culture des plantes à parfum au Congo belge. (The culture of essential oil plants in the Belgian Congo.)  
*Congopresse*, 1951, 83: 1727-8, Dutch text, p. 1736, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 274.  
f ANON.  
Verenigde Staten: rubberproductie. ([Guayule] rubber production in the United States.)  
*Landb. Wereldnieuws*, 1950, 5: 465, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 83.  
New guayule varieties are mentioned.



- g BONNEMAISON, L.  
Protection des crucifères oléagineuses contre les méligèthes. (Control of pollen beetles on oil-producing crucifers.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 441-4, bibl.
- h CALLAO, V., AND VIGARAY, J.  
Estudios sobre la fermentación del esparto. I. Flora aerobia de la fermentación en el enriado experimental. (Studies on the fermentation of esparto grass. I. Aerobic fermentation bacteria used in retting experiments.) [English summary  $\frac{1}{2}$  p.]  
*An. Edaf. Fis. veg. Madrid*, 1951, 10: 525-35, bibl. 5, illus.
- i CARSON, J. F.  
The structure of humulone and lupulone as revealed by ozonization.  
*J. Amer. chem. Soc.*, 1951, 73: 4652-4, bibl. 6.
- j VAN DEN DOOL, H.  
Notes on the description and classification of essential oils.  
*Perf. ess. Oil Rec.*, 1950, 41: 11: 399-403, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 24.
- k GERRETSEN, F. C., AND HAAGSMA, N.  
Occurrence of antifungal substances in *Brassica rapa*, *Brassica oleracea* and *Beta vulgaris*.  
*Nature*, 1951, 168: 659.
- l KAISER, A.  
Breves noções sobre a mamoneira e sua tecnologia. (Brief considerations on the castor bean and the technology of its oil extraction.)  
*Rev. Agric. Piracicaba*, 1951, 26: 230-6, bibl. 10.
- m NARASIMHA RAO, P. L., AND VERMA, S. C. L.  
The antibiotic principles of *Garcinia morella* [Mysore Gamboge tree]: I—Preparation and antibacterial activity of morellin, morellin-T, morellin-M, morellin-L and iso-morellin.  
*J. sci. industr. Res. India*, 1951, 10B: 184-5, bibl. 8.
- n SELLSCHOP, J.  
The production of safflower seed.  
*Fmg S. Afr.*, 1951, 26: 253-6, bibl. 8.  
A guide for the practical grower.

## FLORICULTURE.

*General.*

(See also 25, 55, 1050, 1062, 1111, 1112, 1123.)

771. BATES, G. H.  
The texture of flowers.  
*J. roy. hort. Soc.*, 1951, 76: 405-10, bibl. 1.

A fascinating study in which the effect on the human eye of different flowers is considered and how the epidermal cells may contribute to the production of an effect like velvet as in the pansy or the scarlet coat effect of, say, *Salvia splendens*. The lustre of petals similarly would appear to be due to the epidermal cells being flat and elongated.

772. ANON.  
Zimmerpflanzen in Wasserkultur. (Water culture for plants indoors.)  
*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 13, p. 1, illus.

Young foliage plants replanted in moss in shallow aluminium containers, with holes in the bottom, to be fitted in ornamental pots containing water solution, are marketed by two Swiss firms. The nutrient solution is prepared by dissolving a pill, "aqua flor", of compressed salts [content not stated] in 1 l. water, which is also recommended for fertilizing potted plants.

773. KELL, J.  
La situation économique de la floriculture gantoise. (The economic position of floriculture in the Ghent district.) [English and German summaries  $\frac{1}{2}$  p. each.]  
*Rev. Agric. Brux.*, 1950, 3: 1031-9.

Floriculture is an important industry in the Ghent

area of Belgium, its economic value being equal to that of chicory and grape production. The industry is now going through a critical period as a result of reduction in exports and increased costs of production, and new markets are being sought. Export figures and prices are given.

774. HAWES, J. E., AND LINK, C. B.  
Physiological studies of prepackaged cut flowers.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 423-31, bibl. 8.

In film-enclosed packages of roses, chrysanthemums, carnations and snapdragons carbon dioxide accumulated and oxygen was depleted. The permeability of the films was affected by temperature and length of storage and the latter factors affected the post-storage life of the flowers. The respiration rate of roses and chrysanthemums was decreased, and that of carnations increased, by packaging at 32° and 50° F. rather than at higher temperatures. C.W.S.H.

775. FISCHER, C. W., JR., AND KELLER, J. R.  
The prevention of decay of horticultural products by the use of brominated activated charcoal.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 432-8, bibl. 3, illus.

Cut flowers are susceptible to fungus attack in shipment or storage. Although brominated charcoal inhibited *Botrytis* growth on carnations and *Ascochyta* growth on chrysanthemums, the limitations of this method are many and include deliquescence and subsequent loss of effectiveness together with toxicity to plants when in direct contact. C.W.S.H.

776. DESHUSSES, L. A., AND DUPERREX, A.  
Études de techniques culturales en floriculture. Recherche d'un milieu standard de culture. (Studies in cultural technique of flower production. Investigations on a standard rooting medium.)  
*Rev. hort. suisse*, 1951, 24: 366-70, bibl. 1, illus.

The possibilities of developing a standard potting compost were investigated at the Laboratory of Agricultural Chemistry, Châtelaine, Geneva. The John Innes composts gave excellent results, but the materials are not readily available in French Switzerland. Gloxinias were grown in 10 different composts consisting of various types of peat or mixtures of soil, peat, sand or leaves. Nutrients and water were supplied by plunging the pots into a solution of complete fertilizer. The following 4 composts gave outstandingly good results: (1) granular peat alone with grains 1-2 mm. in diameter, (2) granular peat, one-third with grains 4-5 mm., two-thirds with grains 1-2 mm., (3) granular peat, one-third with grains 1-2 mm., two-thirds with grains 4-5 mm., (4) one-third soil, one-third fibrous Swiss peat, one-third silicious sand. It is concluded that for gloxinias the best rooting medium is one which, when drained, contains 17-37% water and 39-53% air.

#### *Annuals and herbaceous plants.*

(See also 626, 842b, c, j, k, 1052, 1053.)

777. PRYOR, R. L.  
Self pollination techniques and seed set on autotetraploid antirrhinums.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 406-7.

Pollination with a camel hair brush produced more pods, seeds and seeds per flower than pollination by gently pinching or shaking the flowers of Christmas Cheer and Copper King (tetraploid) or Ethel (diploid) antirrhinums. C.W.S.H.

778. HARRISON, A. D.  
Carnations under glass.  
*Agriculture, Lond.*, 1951, 58: 284-8.

The carnation is a crop that needs care and knowledge, but one that can be grown to complete satisfaction in sand or aggregate to which the necessary nutrients are supplied by sub-irrigation. Installations for that type of cultivation seem likely to increase. The present bulletin describes cultivation in soil under glass.

779. GUBA, E. F., AND AMES, R. W.  
Top soil application of chemicals for controlling carnation wilt diseases.  
Abstr. in *Phytopathology*, 1951, 41: 657-8.

Numerous chemicals were compared to determine their effectiveness in disinfecting soil for control of *Fusarium dianthi*, *Rhizoctonia solani*, and *Phytophthora caryophylli*. None of the fungi was recovered from any of the mixtures of Phygon and soil. Fermate was strongly fungicidal and striking action was shown by Semesan Jr., Semesan, Semesan Bel, New Improved Ceresan, and mercuric bichloride at 0.05 g. per 30 g. soil.

780. STEWART, R. N.  
Colchicine-induced tetraploids in carnations and poinsettias.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 408-10, bibl. 4, illus.

The production of tetraploid carnations showing stocky growth and large flowers is described. It is considered likely that a decrease in flower production may follow the production of such tetraploids. Some tetraploid poinsettias showed heavier bracts and heavy, stocky growth. Selfed progeny showed similar characters. C.W.S.H.

781. SCHWABE, W. W.  
Factors controlling flowering in the chrysanthemum. II. Day-length effects on the further development of inflorescence buds and their experimental reversal and modification.\*  
*J. exp. Bot.*, 1951, 2: 223-37, bibl. 42, illus.

1. Inflorescence buds, produced by vernalized chrysanthemum plants in long day, cease to grow, and die at an early stage if maintained in long day, but will produce open flowers if transferred to short day. Dissection of such buds reveals that development does not proceed beyond the formation of the bare receptacle and no florets are initiated, while inflorescence buds produced in short day have almost completed floret initiation when they become macroscopically visible. 2. Inflorescence buds produced in long day can be induced to complete their development in long day by: (a) removal of all lateral shoots, and (b) by re-rooting the inflorescence itself, leaving only a number of bracts on its axis. 3. Inflorescence buds produced in short day can be inhibited from developing by: (a) transfer to long day, (b) transfer to low light intensity in short day, and (c) application of auxin paste. All three methods of inhibition become progressively less effective with the advancing development of the bud. 4. The latest stage at which development was found to have been arrested was that of ovule formation. 5. Heights of plants were determined at budding and when the flowers had started to open; marked differences due to length of day were found. 6. Teratological effects noted in buds, exposed for extended periods to long day, included formation of bracts on the receptacle (the absence of which distinguishes the subtribe *Chrysantheminae* of the Compositae to which the chrysanthemum belongs) as well as secondary inflorescences, petaloid stamens, etc. 7. The results are discussed in relation to known effects of auxin on vegetative growth and reproduction. [Author's summary.]—Imp. Coll. Sci. Technol., London.

782. POST, K., AND LACEY, D. B.  
Interrupted short-day improves standard chrysanthemums.  
*Bull. N.Y. St. Flower Gr.*, 1951, No. 70, pp. 2-4, illus.

In trials at Cornell interrupted short-day treatments improved certain standard chrysanthemums where quality was poor because of open centres. The optimum number of preceding short days and interrupting long days varied with variety.

\* For abstract of the first paper of this series, see H.A., 21: 1883.

783. FURUTA, T.

Pinching levels growth, aids uniformity in development of sprays on pompon mums.  
*Flor. Exch.*, 1951, 117: 8: 10, 42, illus.

The length of time a shoot grows on a chrysanthemum stock plant before the cutting is taken from that shoot influences the spray formation of unpinched plants. In trials carried out at the Ohio State University it was shown that when shoots were pinched before or at the time the cuttings were taken, all subsequent growth was about the same age, developed evenly and produced uniform sprays.

784. BAILEY, F. V.

Observations on varietal resistance to chrysanthemum rust.  
*J. roy. hort. Soc.*, 1951, 76: 322-8, illus., bibl. 8.

The life history of *Puccinia chrysanthemi* is briefly described. In artificial infection trials at University College, Exeter, marked varietal resistance, varying from 32% to 2.3% infection, was observed in the 44 varieties studied. The assessment of rust was made on leaf infection.

785. CIFERRI, R.

Segnalazione del mosaico del tropeolo (tropaeolum) in Italia. (The tropaeolum mosaic in Italy.)  
*Not. Mal. Piante*, 1951, No. 16, p. 16.

Tropaeolum mosaic has been found on garden nasturtiums, *Tropaeolum majus nanum*, *T. minus* and "Lobby" hybrids in the Pavia Botanical Garden.

786. TIZIO, R.

Efecto de las bajas temperaturas en la primera fase de desarrollo (termofase) en *Matthiola incana* R.Br. (The effect of low temperatures during the first developmental phase (thermophase) in *Matthiola incana*. [English summary ½ p.]  
*Phyton*, 1951, 1: 1: 28-41, bibl. 7.

Immediately after germination stock seedlings were subjected to a constant temperature of 2° C. for a period of 15, 25 or 30 days during the months of July, August or September. The effect of this vernalization on the date and percentage of flowering was studied. It was concluded that 2° C. is within the temperature limits within which the thermophase can be completed. It is not, however, the optimum temperature for completion of the thermophase, as it did not result in 100% flowering. A higher percentage of flowering was obtained in the vernalized than in the unvernallized plants, the difference being greatest in the September sown plants. Vernalized plants also flowered earlier. This experiment showed that, with the temperature used, the thermophase starts a few days after germination and lasts for at least 15 days.—Univ. La Plata, Argentina.

787. ARK, P. A.

Occurrence of crown gall on yarrow.  
*Plant Dis. Repr.*, 1951, 35: 42.

Crown gall (*Agrobacterium tumefaciens*) has been observed on ornamental types of yarrow (*Achillea ptarmica* and *A. ptarmica* var. Snow Ball) imported into California.—Univ. of Calif.

**Bulbs, tubers, etc.**

(See also 6, 842a, d, f, i, l.)

788. VAN RAALTE, D.

Het forceren van bolgewassen. (Forcing bulbs.)

*Cult. Hand.*, 1951, 17: 496-9, 557-60, illus.

This article is in two parts. The first discusses the forcing of bulbs in general terms under: early flowers as a result of scientific research, pre-treatment of bulbs, the importance of temperature, the development of plant organs in the tulip, practical advice. The second part deals with temperature in more detail with reference to daffodils, other narcissi, tulips and hyacinths.

789. ARNALDO, M. R., AND CAPINPIN, J. M.

Artificial pollination and seedling production in begonia.

*Philipp. Agric.*, 1950, 34: 96-109, bibl. 5, illus., being *Contr. Exp. Stat.* 1568.

In these pollination studies 8 forms of *Begonia* were used which are described and tentatively identified with species described by Baily and Buxton. Only 4 forms were self-compatible and only 2 combinations cross-compatible. Some data are given on the germination of the seeds in double pots and on moss-covered stones.

790. LEWIS, C. A.

Some effects of daylength on tuberization, flowering and vegetative growth of tuberous-rooted begonias.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 376-8, bibl. 4.

By varying the temperature and photoperiod it was shown that with short winter days, but temperature maintained at 60-70° F., there is no dying back of the plant down to the tuber as is the case in ordinary winter weather. The plant, however, remains quiescent. Tubers are produced by the combination of excess carbohydrates and short days, but the leaves must have reached the right stage. Lengthened photoperiods favour vegetative growth and flowering.  
 C.W.S.H.

791. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

The broad mite (*Hemitarsonemus latus*) as a pest of dahlias.

*Agric. Gaz. N.S.W.*, 1951, 62: 252-3, illus.

The broad mite, usually a pest of silver beet (*Beta vulgaris*), is recorded as damaging dahlias in New South Wales. It causes curling and distortion of the foliage. Dusting with finely divided sulphur or spraying with water-dispersible sulphur 1 oz. to 1 gal. of water has given satisfactory control.

792. MAGIE, R. O.

Mulching gladioli with aluminium foil.

*A.R. Fla agric. Exp. Stat. for 1949-50*, p. 137, illus.

The application of a layer of 0.0015 in. aluminium foil to cover the soil 15 in. on either side of the gladiolus row resulted in greatly increased yields and earlier flowers in the Picardy variety. Cormel plants emerged sooner and produced much greater weight of corms when grown under the mulch. The chief value of the foil appeared to lie in protecting the soil from rapid



and extreme changes in moisture content, thus making conditions more favourable for root growth.

793. EVENARI, M., KONIS, E., AND ZIRKIN, D.  
The breaking of the rest period of *Gladiolus* corms.

*Palest. J. Bot. (J)*, 1950, 5: 32-45, bibl. 16.

Under Palestine conditions summer corms formed on parent gladiolus plants during March to October show sprouting that is much delayed, uneven and incomplete, with in most cases failure to flower. Winter corms formed during November to February have little or no rest period, sprout easily and give complete and early flowering. In experiments with summer corms of several varieties, notably Picardy, pre-cooling at 4° C. for 20 days or a 3-day treatment with either a 0.3% solution of ethylene chlorohydrin or a 4% solution of thio-urea shortened the rest period, stimulated sprouting and flowering, and generally increased the average number of flowers per inflorescence. Alternate heating at 35° C. and cooling at 4° C. had a greater effect than cooling alone. The same treatments had little or no effect on winter corms.

794. MAGIE, R. O.  
Controlling gladiolus corm diseases.

*A.R. Fla agric. Exp. Stat. for 1949-50*, pp. 129-30.

Dusting with Spergon immediately after cleaning the corms provided the best protection against infection by *Fusarium oxysporum* f. *gladioli*. Soaking corms in Spergon (wetable) dip for 5 min. 18 hours after cleaning was also found satisfactory. Of fungicidal dips applied at cleaning time, ceresan, SR-406, seedox, tersan, phygon-XL and dovicide A showed considerable promise.

795. MAGIE, R. O.  
Stunt, wilt equal corm rot in gladiolus fusarium.

*Flor. Exch.*, 1951, 117: 4: 8, 41.

Phases and symptoms of the disease caused by *Fusarium oxysporum*, other than corm rot, are: yellowing of leaf tips on oldest leaves, blackened root bases, stunting of spike including florets, excessive wilting of young spike sometimes resulting in stem crook just below the head and occasional bending of leaves or spike nearer the ground. As far as is known, there are no gladiolus varieties immune or completely resistant to the disease, though in some strains the infection may be latent. To keep the stock disease-free gladioli should be planted only on clean, but not necessarily new land, and it is advisable to dust the corms before storage with Spergon or Arasan with DDT added. For corms known to be affected, a 15 min. soaking in 3 lb. of Dovicide B in 50 gal. water is recommended.

796. PRITCHARD, A. E.  
Seed-corn maggot on gladioli.

*Calif. Agric.*, 1950, 4: 9: 13, illus.

*Hylemya cilicrura* has seriously injured gladioli in the San Francisco Bay area. The primary shoots were attacked. An experiment showed that good control was obtained by spraying 4% wettable Chlordane powder, diluted in water at the rate of 3 lb. per 100 gal., onto corms placed in the furrow. Fair control was also obtained with Lindane. C.W.S.H.

797. ANON.

Le thrips de glaieul. (*Gladiolus thrips*.) [English and German summaries 6 and 7 lines respectively.]

*Rev. Agric. Brux.*, 1951, 4: 257-70, bibl. 10, illus.

*Gladiolus thrips* appeared for the first time in Belgium in 1950. The literature on its distribution, biology, damage and control is reviewed.

798. BEAUMONT, A.  
Diseases of bulbous irises.

*Gdnrs' Chron.*, 1951, 130: 73-4.

Recommendations are made for the control of diseases caused by fungi. The only virus disease attacking bulbous iris is that known as mosaic or stripe.

799. VAN WOUDEBERG, J.  
Siergewassen. (Ornamental plants [*Phaemeria*].)

*Landb. Nieuws, Suriname*, 1950, 2: 20: 5-8, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 51.

A popular botanical article on the Brazilian lily, *Phaemeria* sp., belonging to the family Zingiberaceae, with a short history of its introduction into Suriname.

800. MINISTRY OF AGRICULTURE, LONDON  
[ABBESS, H. W.]

Narcissus culture.

*Bull. Minist. Agric. Lond.* 44, 2nd edition 1950, reprinted 1951, pp. 39, illus., H.M. Stationery Office, 2s. 6d.

Since the first edition in 1932 this bulletin has been completely rewritten. Modern practices of commercial flower production and marketing are fully described, while some rather incidental information is also included on bulb production. The first sections present the revised R.H.S. classification of daffodils, lists of recommended varieties and an explanation of bulb designations, such as "mother", "round" and "chip". Sections then follow on climatic and other factors influencing production, soils, manuring, planting, plantation management, marketing and acceleration of flowering. Pests and diseases are not dealt with in detail, but the routine practices of spraying and warm water treatment are described. There are two appendixes, one describing local practices in the principal narcissus producing areas, and the other recommending protective measures to be taken against daffodil rash. Methods of planting, bunching and forcing are well illustrated.

801. ROBERTSON, R. M.  
An experiment with daffodils.

*Gdnrs' Chron.*, 1951, 130: 52.

The effect of chilling daffodil bulbs (variety Sir Watkin) for 3 days at 23° F. before growing them at 55° F. or 75° F. was studied. All the bulbs were planted on 20 September. The chilled unforced lot flowered the earliest, on 23 February. This was followed 14 days later by the unchilled unforced lot, 39 days later by the unchilled forced lot, and 44 days later by the chilled forced lot. [Note: The date 9 May appears to be a misprint for 9 March.]—Univ. Coll., Dundee.

## Ferns.

802. ANON.

De cultuur van varens. (The cultivation of ferns.)

Cult. Hand., 1951, 17: 154-8, illus.

The raising of ferns is described and their life history is outlined. The soil in which the spores are sown must be heat sterilized, and the temperature of the soil during the first few weeks should be kept at about 75° F. A pH of about 6.5 is suitable for the soil in which the young plants are raised.

803. KROMDIJK, G.

Het kweken van *Adiantum scutum*. (The cultivation of *Adiantum scutum*.)

Cult. Hand., 1951, 17: 343-5.

*Adiantum scutum* [a form of *A. tenerum*] is said to be the maiden-hair fern most commonly grown. Its characters, and those of ferns in general, are described, with advice on raising and cultivation.

804. PUSSARD, R.

Un mollusque endogé, *Caecilioides acicula* Müller, ravageur méconnu d'*Asparagus plumosus* Bak. (An endogenous mollusk, *Caecilioides acicula* Müller, as a pest of *Asparagus plumosus* Bak.)

C.R. Acad. Agric. Fr., 1951, 37: 82-4.

This small fragile mollusk (5 × 1 mm.) has been found attacking young *Asparagus plumosus* plants in Antibes. The losses are most serious in winter and spring, and appear to cease in summer. Injecting the soil with carbon disulphide at 50, 75, or 100 g. per sq. m. is recommended.

## Orchids.

(See also 842h.)

805. HSIANG, T-H. T.

Physiological and biochemical changes accompanying pollination in orchid flowers.

I. General observations and water relations.

Plant Physiol., 1951, 26: 441-55, bibl. 28, illus.

Pollination was shown to bring about the external visible changes reported by earlier workers such as the wilting of perianth, the closing of the stigma, the enlargement of the column, and sometimes the swelling of the ovary. In *Cymbidium*, as an immediate effect of pollination, the lip of the perianth as well as the inner side of the column turned from white to red. The red pigment was proved to be anthocyanin. The appearance of colour was not associated with any change in sap pH. Pollination brought about increases in both fresh and dry weights of the column. On a percentage basis, the increase in fresh weight was greater than that in dry weight at the beginning; later on this relationship was reversed. This indicates an initial dominance of water uptake over increase in dry matter. The perianth after pollination not only lost water, but also dry matter. Cut flowers responded to pollination in essentially the same manner. Osmotic pressure measured 115 hours after pollination showed a slight increase over the control. This did not appear to be sufficient to account for the difference in the

amount of water uptake. In air, cut discs of columns from pollinated flowers took up more water on a percentage basis than those discs of columns from non-pollinated flowers. This difference was significantly established within 30 minutes after the tissues were immersed in water. However, in a nitrogen atmosphere, this difference disappeared. It is concluded that the pollen- or auxin-stimulation of water uptake is related to aerobic processes. Columns from pollinated flowers were shown to have a greater water-holding capacity. It is postulated that pollination causes an increase of hydrophilic colloids in the column tissue. The wilting of the perianth after pollination and auxin treatment results from an increased rate of epidermal transpiration. [From author's summary.]

806. HOLDSON, J., AND LAURIE, A.

The effect of supplementary illumination on the flowering of the orchid *Cattleya trianae*.

Proc. Amer. Soc. hort. Sci., 1951, 57: 379-80, bibl. 1.

This orchid normally initiates flower buds in March and April in Ohio. The buds reach the sheath stage in June-July, elongate in October-November, and flower in December-January. Flowering is controlled by length of day. By artificially increasing the length of day flowering was inhibited until the plants were again exposed to short days. In this way it was possible to delay the crop until Easter. C.W.S.H.

807. MEYER, J. R.

Transplante de "seedlings" de orquídeas de frascos de cultura para vasos com xaxim. (Transplanting orchid seedlings from culture vessels to pots containing fern fibre.)

[English summary  $\frac{1}{2}$  p.]

Biológico, 1951, 17: 99-102, bibl. 1, illus.

A mixture of stem fibres from the fern *Dicksonia sellowiana* and sand prepared from grey granite was found to be a satisfactory medium into which to transplant orchid seedlings. The sand was prepared by grinding the granite to grains of not more than 2 mm. in diameter. Both sand and fibre were boiled before use. Clay pots were crocked in the usual manner, a thin layer of fibre was placed over the crocks and this was covered with a layer of sand. Finally came a mixture of 1 part sand to 2 parts fibre. Growth of the seedlings was better in this mixture than in fibre alone, a fact which is attributed to the more constant moisture content of the medium and to the presence of small amounts of mineral substances.

808. FIGUEROA POTES, A.

La utilidad de la thiamina, las sales minerales y las fitohormonas en el cultivo de orquídeas. (The use of thiamine, mineral salts and growth substances in orchid culture.)

Acta agron. Palmira, 1951, 1: 65-9, bibl. 9.

Modern methods of sexual and vegetative propagation of orchids are briefly reviewed.

809. JENSEN, D. D., AND GOLD, A. H.

A virus ring spot of *Odontoglossum* orchid: symptoms, transmission, and electron microscopy.

Phytopathology, 1951, 41: 648-53, bibl. 7, illus.

A virus disease of *Odontoglossum grande* is characterized by single or concentric necrotic rings on the leaves enclosing tissue varying from normal green to black. The host range of the virus appears to be limited, outside *Odontoglossum*, as no symptoms were produced in any of 20 species of plants representing 18 genera in 11 families of plants inoculated mechanically with infective juice. The ring-spot virus particles are rod-shaped and sometimes slightly curved.—Univ. of California.

810. ARK, P. A., AND STARR, M. P.

Bacterial diseases of orchids.

*Plant Dis. Repr.*, 1951, 35: 42-3, bibl. 2.

Brown spot of *Phalaenopsis* and *Cattleya* orchids caused by *Phytophthora cactleyae*, brown rot of *Cypripedium* caused by *Erwinia cypripedii*, and leaf scorch and pseudobulb rot of *Miltonia* caused by an unidentified species of bacterium are frequently found in orchid houses in central California and can lead to considerable losses. The soft rot of *Cattleya*, caused by *Erwinia carotovora*, has been found only once. Bacterial diseases of *Phalaenopsis*, *Miltonia* and *Cypripedium* can be controlled by drenching or soaking in 8-quinolinol benzoate (or sulphate) and the sodium salt of *o*-hydroxydiphenyl (Natriphene). Brown spot on *Cattleya* is controlled by local application of 1:1,000 corrosive sublimate. [Authors' summary.]—Univ. of Calif.

811. ARK, P. A., AND SNYDER, W. C.

Black spot of *Vanda* orchids.

*Plant Dis. Repr.*, 1951, 35: 43-4.

A black spot disease on blooms of *Vanda tricolor* caused by *Glomerella* sp. is controlled by spraying the blossoms with a solution of Bioquin 700 (*o*-quinolinol benzoate) before the appearance of the symptoms.—Univ. of Calif.

Roses.

(See also 361, 733.)

812. CALVINO, E. M.

Ricerche sul polline del genere *Rosa*. (Investigations on pollen of the genus *Rosa*.) *Ann. Sper. agrar.*, 1951, 5: 377-410, being *Pubbl. Staz. sper. Floricolt. O. Raimondo, San Remo* 48, 1952.

The author gives an account of her work in Cuba and at San Remo, Italy, and some of the observations made on 11 species and 50 varieties of rose. She has noted morphological and biochemical characters, percentage of aborted pollen, the relation between pollen, number of chromosomes and certain somatic characters, the reserve substances in pollen, germinability under different conditions, viability and methods of prolonging viability. She discusses her findings at some length.

813. POST, K., AND FISCHER, C. W., Jr.

The potassium-calcium nutrition of greenhouse roses.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 361-8, bibl. 8.

A potassium level of 100 lb. per acre was insufficient for maximum rose production, but there was no advantage in maintaining a level higher than 300 lb. per acre. Potassium deficiency symptoms were more

severe in the summer and early autumn, and this is considered to be due to the higher light intensity resulting in greater growth and production in summer than in winter. High soil potassium resulted in a high potassium content of the plant tissue. Calcium levels were kept at 2,500 and 7,500 lb. per acre by the application of calcium sulphate. Flowering was reduced by the high level in the first year and this was thought to be due to the high soluble salts content which resulted, not to direct toxicity of the calcium. C.W.S.H.

814. CARRIER, L. E., AND SNYDER, W. E.

Preliminary investigations of the effects of controlled low temperatures on outdoor roses.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 381-6, bibl. 3.

Pink Radiance roses on multiflora rootstocks were placed in a special apparatus and subjected to various temperature treatments. Temperatures below 8° F. were lethal to roots. Root injury was apparent on plants subjected to a temperature of 16° F. Cuttings of Pink Radiance were killed at 5° F., but not injured at 8° F. Seedling multiflora roots were injured at temperatures below 21° F. in March after bud growth. Root injury is more likely to occur than injury to canes, and small roots are more easily injured than large ones. C.W.S.H.

815. JAFFNE, E. E., AND CHADWICK, L. C.

Influence of storage and pruning practices on the growth and flower production of outdoor roses.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 387-92, bibl. 6.

Plants of the variety Sister Therese were stored in wooden crates on 15 December and kept at various temperatures until 30 May or 30 June. In the following year plants of the variety Shangri La were used in a similar experiment. Saleable plants were produced even when held in store as late as 30 June. Temperatures of 32-35° F. were most suitable. Higher temperatures gave poorer growth and appearance, lower temperatures less mould. Gradual increase in temperature before late planting was desirable. Pruning to 10 inches before storage gave good results and pruning to 5-6 inches after storage did not reduce flowering. C.W.S.H.

816. DIMOCK, A. W.

Bud transmission of *Verticillium* in roses.

*Phytopathology*, 1951, 41: 781-4.

It is shown that buds taken from *Verticillium*-infected rose plants may serve to infect the canes of susceptible varieties into which they are inserted.—Cornell Univ.

817. LORDELLO, L. G. E.

Algumas notas sobre *Macroductylus pumilio* Burn., 1855, e *Pelidnota* (*Pelidnota*) *pallidipennis* Bates, 1904. (Some notes on *Macroductylus pumilio* and *Pelidnota pallidipennis*.) [English summary ½ p.] *Rev. Agric. Piracicaba*, 1951, 26: 109-16, bibl. 6, illus.

Serious damage was caused to roses and other ornamentals in Cordeirópolis, São Paulo, in 1950 by the chafers *Macroductylus pumilio* and *Pelidnota pallidipennis*. A review of the Brazilian literature shows that the former species has been reported as a pest of citrus,



pears, coffee, roses, marguerites and dahlias. In São Paulo the author found it on *Rosa* sp., *Callistephus chinensis*, *Chrysanthemum maximum*, *Dahlia* sp., *Ligustrum lucidum* and *Aspidosperma polyneuron*. Only the flowers were attacked. The latter species has not previously been reported as a pest. It was found attacking rose flowers in São Paulo, but did much less damage than *Macrodactylus*.

818. PUSSARD, R.  
Les buprestes du rosier de mai. (The buprestid beetles of the cabbage rose.)  
*C.R. Acad. Agric. Fr.*, 1951, 37: 265-6.

The cabbage rose (*Rosa centifolia*), cultivated around Grasse (south-east France) for its perfume, is constantly attacked, particularly on dry soils, by the larvae of the buprestid beetles, *Coraebus rubi* and *Agrilus aurichalceus*. Control measures recommended are applications of HCH dusts after the flowers are picked at intervals of 10-15 days.

### Shrubs.

(See also 842g, n, 1061.)

819. HUME, E. P.  
Some ornamental shrubs for the tropics.  
*Circ. P.R. fed. Exp. Stat. Mayaguez* 34, 1951, pp. 151, bibl. 23, illus.

The information contained in this circular is based on observations made on the plant collection of the Federal Experiment Station, Mayaguez, and on shrubs grown in the gardens of Puerto Rico. Palms, cycads and typically desert shrubs are not included. General notes on conditions limiting growth in the tropics and on the utilization and planting of shrubs include lists of shrubs adapted to special conditions and uses, shrubs grouped according to size and form, and shrubs classified according to their desirable features, such as foliage, flowers, fragrance or fruit. The bulk of the text is devoted to brief descriptions of 123 species, with notes on their requirements, uses and propagation. Most of the species are illustrated. The plants are indexed by scientific and common English and Spanish names.

820. BORTHWICK, H. A., PARKER, M. W., AND RAPPLEYE, L.  
Photoperiodic responses of azaleas.  
*Flor. Exch.*, 1951, 117: 15: 17-18, bibl. 3, illus.

Photoperiodic treatments applied during the summer appeared to have been without marked effect on the time of flower initiation in several varieties of azalea, nor did they affect subsequent bud development so as to cause differences in blooming date the following spring. Appropriate treatment did result, however, in production of plants of larger size and more diffuse branching.—U.S. Dep. Agric., Beltsville, Md.

821. KIPLINGER, D. C., AND BRESSER, H.  
Some factors affecting multiple bud formation on azaleas.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 393-5, bibl. 3.

An increase in multiple bud formation, as opposed to single buds, would increase the number of flowers per plant. Total flower buds and multiple buds were

increased by increasing the nitrogen level from 25 p.p.m. to over 50 p.p.m., and by shading to produce a short day in August. More total buds and twice as many multiple buds were produced by full sun exposures instead of lath shade, in June, but hard plants giving uneven flowering resulted. C.W.S.H.

822. WELLS, J. S.  
Pointers on propagation.  
*Amer. Nurseryman*, 1951, 93: 10: 13-14, illus.

Nursery stock in general, rhododendrons and azaleas in particular, are recommended for early planting in the spring. Of lilacs, grafted on California privet in January and set out over a period of 6 weeks starting from early April, those planted first were eventually the best. Planting machinery and preparation of land are discussed.

823. CORTVRIENDT, S. F., AND BRACKE, J.  
La culture sans terre. (Soilless culture.)  
[English and German summaries  $\frac{1}{2}$  p. each.]  
*Rev. Agric. Brux.*, 1950, 3: 1179-96, bibl. 10, illus.

A review of the various methods used for the soilless culture of plants is followed by an account of experiments carried out at the Station de l'État pour l'Amélioration des Plantes Ornementales, Ghent, on the use of vermiculite for forcing azaleas. The roots of 1-year-old azalea plants, grown in soil, were washed clean and the plants transferred to tanks filled with vermiculite or a mixture of vermiculite and sand and fed with nutrient solutions. The plants grown in vermiculite flowered about a fortnight earlier than those grown in soil. Plants grown in the mixture of vermiculite and sand did not make very good growth and did not flower so early as those grown in vermiculite alone.

824. CORTVRIENDT, S. F., AND DE GROOTE, R.  
Le forçage de quelques variétés d'azalées dans un substratum de vermiculite, suivant la méthode sub-irrigatoire. (Forcing some azalea varieties in vermiculite by the sub-irrigation method.) [English and German summaries 3 lines each.]  
*Rev. Agric. Brux.*, 1951, 4: 959-66, bibl. 1, illus.

Experiments made by the Ghent Station [see previous abstract] in the use of vermiculite as a substrate for forcing azaleas [see preceding abstract] were continued with a further 7 varieties and with an improved technique for supplying and draining the nutrient solution. The technique is described in detail. The plants were transplanted from soil to pots containing vermiculite when 1 or 2 years old. With all the varieties tested, except Petrick alba, the plants grown in vermiculite flowered 2 weeks earlier, and continued flowering for 2-3 weeks longer, than the control plants in soil. With Petrick alba flowering was delayed several days. With all the varieties the flowers were larger than those of the controls. The plants did not suffer a set-back on being transplanted into vermiculite. The results were better with 2-year-old than with 1-year-old plants.

825. TWIGG, M. C., AND LINK, C. B.  
Nutrient deficiency symptoms and leaf analysis of azaleas grown in sand culture.  
*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 369-75, bibl. 15, illus.

The symptoms exhibited by azaleas (*Rhododendron obtusum japonicum*, variety Coral bells), given nutrient solutions lacking N, K, B, Mg, Ca, Fe or P, are illustrated and described. Lack of Cu produced no symptoms. There was a correlation between the deficiency symptoms and the concentration of the particular element concerned in the leaves. There was an indication that azaleas require comparatively small quantities of P, K, Ca and Mg. C.W.S.H.

826. PAPE, H.

Eine Azaleen-Blütenkrankheit kommt nach Europa. (A disease of azalea flowers comes to Europe.)

*Gartenwelt*, 1951, No. 8, from abstr. in *Rev. Agric. Brux.*, 1951, 4: 908.

A fungus spot of azalea flowers, caused by *Ovulinia azaleae*, was observed for the first time in Switzerland in 1949. It had previously been known only in America. The symptoms are described. For control under glass, all diseased plants should be burnt and the remainder sprayed from the time the flowers start to colour until they are fully open. In America, good control has been obtained with a mixture of 1-1.5 l. Dithane, 0.5 kg. zinc sulphate and 0.25 kg. hydrated lime in 400 l. water.

827. THIEL, J.

Zwamziekten bij de *Azalea indica* L. (Fungus diseases of *Azalea indica*.)

*Cult. Hand.*, 1951, 17: 494-6, illus.

Brief descriptions are given of the diseases caused by *Exobasidium azaleae*, *Pestalotia* [?] *longiseta*, *Septoria azaleae*, *Gloeosporium* sp., *Botrytis* [?] *cinerea*, *Hormodendron cladosporioides*, *Alternaria* sp. and *Stemphylium* sp., and *Cylindrocarpon radiculicola*. *Septoria azaleae* is said to be the most harmful of these, for infected plants are weakened and yield smaller blooms. Control measures rely chiefly on good cultivation, though spraying with burgundy mixture is mentioned.

828. ANON.

Winter's finest contribution—the camellias. *Agric. Gaz. N.S.W.*, 1951, 62: 377-9, 383.

A brief historical sketch of the fluctuations in popularity of camellias in New South Wales is followed by cultural notes on choice of aspect, soil conditions, planting, subsequent attention, propagation, fertilizing, camellias in tubs, insect pests and diseases. The article ends with a list of "the outstandingly good varieties in each of the flower form classes", single, semi-double, waratah centred, informal double, and formal doubles.

829. SCHROEDER, C. A.

Heterostyly and sterility in *Carissa grandiflora*.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 419-22, bibl. 1.

*Carissa grandiflora*, the Natal plum or African Carissa, is pollinated in Africa by night hawk moths and thrips. In California insect visitors to the flowers are infrequent and fruiting is irregular. Examination of the flowers showed that long styled pistils are borne in floral tubes with functionless stamens, while short pistils have normal stamens inserted in the tube well above the

stigma. Hand pollinations gave the highest set with cross-pollination. C.W.S.H.

830. AMELINCKX, F.

De Japanese sierkersen. (The Japanese ornamental cherries.)

*Cult. Hand.*, 1951, 17: 341-2.

An account is given of a number of good varieties of Japanese flowering cherries (*H.A.*, 18: 569, 570, 3100) mostly forms of *Prunus serrulata*, but two forms of *P. subhirtella* are mentioned, one of these, *P. subhirtella* var. *autumnalis*, flowering in spring and again in October. As rootstocks for Japanese cherries, the woodland Limburg form of *P. avium* is generally the most suitable, but *P. sachalinensis* is better for some varieties.

831. SMITH, B. C.

An investigation of the rest period in the seed of the genus *Cotoneaster*.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 396-400, bibl. 5.

Excised embryos of 9 species of *Cotoneaster* were soaked for 24, 48 or 72 hours. The percentage of normal seedlings produced increased in most varieties with longer soaking, though 72 hours was too long for *C. divaricata* and *C. rosea*; and with 4 species over 50% normal seedlings were produced without soaking. Embryos were easily excised from the seed after acid scarification, washing and soaking for 48 hours. Four species showed the presence of hydrogen cyanide in small quantities in macerated seed. C.W.S.H.

832. NICKELL, L. G.

Embryo culture of weeping crabapple [at the Brooklyn Botanic Garden].

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 401-5, bibl. 16, illus.

Seeds of the weeping crabapple take a year or more to germinate. A small incision made in the seed coat caused slight expansion and the root grew and coiled itself inside the seed coat. A method is described by which the embryo was excised and germinated on an agar culture medium in a test tube, being transferred to pot at 3-4 weeks old. At 3 months the plants had crowns of 12-16 leaves. The addition of 0.25% thiourea to the medium caused some inhibition of germination and subsequent growth. 100% of the excised embryos cultured without thiourea treatment germinated. It was clear that the seed coat was responsible for germination inhibition in the weeping crabapple. [See also *H.A.*, 21: 152.] C.W.S.H.

833. TOMPKINS, C. M., AND TUCKER, C. M.

Stem and root rot of *Daphne odora* caused by *Phytophthora parasitica*.

*Phytopathology*, 1951, 41: 654-5, bibl. 2.

This disease, found in California, is favoured by excessive irrigation, inadequate drainage, and cool weather. Dark brown to black, irregular, water-soaked lesions appear first on the stem at or near soil level and later coalesce to form larger lesions which frequently girdle the stem. The discoloured roots quickly disintegrate. With only enough moisture to satisfy growth requirements, the incidence of the disease is greatly reduced.—Univ. of Calif.

834. WEBER, G. F., AND ROBERTS, D. A.  
Silky threadblight of *Elaeagnus pungens*  
caused by *Rhizoctonia ramicola* n.sp.  
*Phytopathology*, 1951, 41: 615-21, bibl. 6,  
illus.

The symptoms of this disease are a cortical necrosis of petioles, necrotic leaf lesions, and the attendant superficial mycelial strands. The fungus is pathogenic to a number of other plants.—Univ. of Florida.

835. DICKEY, R. D.  
**Hibiscus in Florida.**  
*Bull. Fla agric. Exp. Stat.* 467, 1950, pp. 32,  
bibl. 10, illus.

The Chinese hibiscus, *Hibiscus rosa-sinensis*, is one of the most widely planted shrubs in southern Florida. A classified list is given, with brief descriptions, of some of the better varieties or hybrid varieties for planting in Florida. This is followed by notes on landscape uses, propagation by cuttings, air layering, budding, grafting and seed, cultivation and flowerbud drop. Other species of *Hibiscus* grown as ornamental plants in Florida are briefly mentioned.

836. ROBERTS, A. N., AND BOLLER, C. A.  
**Holly production in Oregon.**  
*Stat. Bull. Ore. agric. Exp. Stat.* 455, 1948,  
pp. 32, bibl. 6, illus. [received 1951].

A small industry for the production of Christmas holly has grown up in Oregon. It is based on varieties of English holly, *Ilex aquifolium*. These varieties are grouped into the Common English, Dutch, and variegated varieties. Eighteen green varieties and 3 variegated ones are listed. The characteristics of good commercial holly are described. The plant is dioecious, and although a considerable amount of rather poor, parthenocarpic fruit is produced, male trees are required, one per 50 female trees being suggested. Propagation by cuttings, using indolebutyric acid, is advocated. Planting distance is 20-25 feet and intercropping with vegetables, etc., is often practised. Later, cover crops may be introduced after the growing season. The amount of cutting which should be allowed each year has not been determined, but excessive cutting leads to dwarfing. Cutting can be combined with pruning. Methods of handling for market, including hormone dipping to prevent defoliation, are described. C.W.S.H.

837. MACCARIO, G.  
Un albero ornamentale dai frutti vistosi  
(*Koelreuteria formosana* Hayata). (An  
ornamental tree with showy fruits  
*Koelreuteria formosana* Hayata.)  
*Suppl. Ann. Sper. agrar.*, 1951, Vol. 5,  
pp. 1-VI.

A short account of the cultivation and propagation of a tree, *Koelreuteria formosana*, which carries highly ornamental reddish fruits. At San Remo fruits stay on the tree from October till January.

838. STUART, N. W., AND ROCKE, R. M.  
**Nutrient deficiency effects on poinsettias.**  
*Flor. Exch.*, 1951, 117: 7: 10-11, bibl. 2,  
illus.

An illustrated description is given of induced deficiency symptoms observed on poinsettias grown in sand

cultures at the Plant Industry Station, Beltsville, Md. When any of the described symptoms is present on commercially grown plants, the application is recommended of a complete fertilizer with an additional amount of whichever element is deficient, with poinsettias usually potassium. Reduction of root absorbing area due to black root-rot, caused by *Thielaviopsis basicola*, might be expected to produce deficiency patterns in the leaves, particularly if the soil nutrients were unbalanced.

839. BAILLIE, A. F. H., AND JEPSON, W. F.  
**Bud blast disease of the rhododendron in its relation to the leaf-hopper *Graphocephala coccinea* Forst.**  
*J. roy. hort. Soc.*, 1951, 76: 355-65, bibl. 5,  
illus.

On the basis of work over two seasons it is suggested that bud blast, caused by the fungus *Pycnosteanus (Sporocybe) azaleae*, may be directly associated with the leaf-hopper. Observations show that medium sized buds appeared to be most susceptible to insect and subsequent disease attack, and that a number of species and a lesser proportion of hybrids were resistant to the disease. Tentatively recommended control measures are multiple bordeaux sprays for the fungus and 0.1 to 0.2% DDT sprays for the insect.—Imp. Coll. Field Station, Silwood Park.

840. ARK, P. A., AND MACLEAN, N. A.  
**Botrytis spot and blight of tuberoses in California.**  
*Plant Dis. Repr.*, 1951, 35: 45-6, bibl. 4,  
illus.

This disease, caused by *Botrytis elliptica*, when it has not caused serious damage to the leaves, can be checked by spraying the plants with (a) ammoniacal copper, 2 gal. per 100 gal. water, (b) Greenol, and (c) sodium salt of *o*-hydroxydiphenyl, 1:2,000. The treatment should be repeated at fortnightly intervals.—Univ. of Calif.

### Turf.

841. DAVIS, S. H., ENGEL, R. E., AND SILBER, G.  
**Control of brown patch of turf in New Jersey.**  
*Abstr. in Phytopathology*, 1951, 41: 657.

Nine fungicides were tested against brown patch (*Rhizoctonia solani*) on seaside bent (*Agrostis palustris*). Caloclor (mercuric and mercurous chloride) and Orthocide 406 (N-trichloromethylthio tetrahydrothialimide) gave the best results, with less than 1% infection.

### Noted.

842.  
a ANON.  
Wie die Dahlie nach Europa kam. (How the dahlia came to Europe.)  
*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 11,  
pp. 4, illus.  
b BEAUMONT, A.  
**Diseases of carnations.**  
*Gdnrs' Chron.*, 1951, 130: 93-4.



- c BEAUMONT, A.  
Diseases of sweet williams.  
*Gdnrs' Chron.*, 1951, 130: 63.  
Three fungal diseases and their control.
- d DARLINGTON, C. D., HAIR, J. B., AND HURCOMBE, R.  
The history of the garden hyacinths.  
*Heredity*, 1951, 5: 233-52, bibl. 18, illus.
- e DIMITRI, M. J., AND ALBERTI, F. R.  
Las plantas cultivadas en la Republica Argentina. Flacurtiaceas. (Plants cultivated in the Republic of Argentina. Flacurtiaceae.)  
[Publ.] *Minist. Agric. Ganad. B. Aires*, 1951, Vol. VIII, Fasc. 133, pp. 16, bibl. 14, illus.
- f FARMAR, H.  
*Amaryllis belladonna*: its varieties and its hybrids.  
*J. roy. hort. Soc.*, 1951, 76: 391-8, illus.
- g GILGUT, C. J.  
Propagation of woody plants.  
*Brooklyn bot. Gdn Rec.*, 1951, 7: 98-106, illus.  
By seed, cuttings, layers and grafts.
- h GOLD, A. H., AND JENSEN, D. D.  
An electron microscope study of cymbidium mosaic virus.  
*Amer. J. Bot.*, 1951, 38: 577-8, bibl. 6, illus.
- i JANAKI AMMAL, E. K.  
The chromosome history of cultivated nerines.  
*J. roy. hort. Soc.*, 1951, 76: 365-71, illus.
- j LANGDON, A.  
Delphiniums and their cultivation.  
*J. roy. hort. Soc.*, 1951, 76: 348-55, illus.
- k MEAHL, R. P., LITTLE, L. D., JR., AND ATMORE, S.  
1950 Trials of annual flowers at the Pennsylvania State College.  
1950 Marigold and zinnia trials at the Pennsylvania State College.  
1950 Petunia trials at the Pennsylvania State College.  
*Progr. Repts Pa agric. Exp. Stat.* 56, 57, 58, 1951, pp. 28, 8, 8 respectively.
- l MINISTRY OF AGRICULTURE, LONDON.  
Stem and bulb eelworm (*Ditylenchus dipsaci*): horticultural crops. [Damage and control.]  
*Adv. Leaflet. Minist. Agric. Lond.* 175, 1951, pp. 6, illus.
- m MOLINARI, E. P.  
Las plantas cultivadas en la Republica Argentina. Commelinaceas. (Plants cultivated in the Republic of Argentina. Commelinaceae.)  
[Publ.] *Minist. Agric. Ganad. B. Aires*, 1951, Vol. II, Fasc. 36, pp. 23, bibl. 17, illus.
- n MÜRI, E.  
Die Vermehrung in der Gehölzbaumschule. (Propagation in the ornamental nursery.)  
*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 17, pp. 4, illus.
- o PANKOVA, I. A.  
Teratological forms in *Primula sinensis* Lindl. [Russian.]  
*Bot. Zhurnal*, 1950, 35: 581-93, bibl. 29.
- p RANDALL, G. O., GARRISS, H. R., AND SMITH, C. F.  
Successful rose culture.  
*Ext. Circ. N.C. St. Coll.* 200, revised 1951, pp. 24, illus.  
Eminently practical bulletin, all aspects treated.

## SUB-TROPICAL FRUIT AND PLANTATION CROPS.

### General.

(See also 11, 12, 97q, 999, 1000, 1087, 1088, 1090, 1093, 1118.)

#### 843. GROVES, G. R.

Trees, shrubs, palms and succulent plants.  
*Bull. Dep. Agric. Bermuda* 26, 1950, pp. 53.

The greater part of this bulletin is taken up with short descriptions of trees, shrubs, palms and climbing and succulent plants suitable for planting in the sub-tropical climate of Bermuda. The destruction of the native cedar, *Juniperus bermudiana*, by the scale insects *Carulaspis visci* and *Lepidosaphes* sp. has made it necessary to find trees to replace this species. It is suggested that, where the death of cedars has opened up new views, the possibility should be considered sometimes of leaving the view open. In landscaping, the strength of the wind in Bermuda is an important factor and protection by windbreaks is often desirable. Special sections are devoted to hedges, windbreaks, and plants suitable for exposed positions. General

information is given on landscape gardening, planting, plant protection, pruning and cultivation. C.W.S.H.

#### 844. WATERSTON, J. M.

Plant protection in Bermuda.

*Bull. Dep. Agric. Bermuda* 21, 1950, pp. 104.

This is a comprehensive bulletin on the control of diseases and pests of all field crops, vegetables, orchard crops, and ornamental plants commonly grown in Bermuda. Much of the information, particularly that on spraying and dusting and on seed treatment, is given in the form of concise tables. The rest of the bulletin is devoted to plant protection by the cultivation of resistant varieties, plant sanitation, cultivation, physical control (trapping, barriers, etc.), and biological control. There are, in cultivation in Bermuda, potatoes resistant to *Phytophthora infestans*, tomatoes resistant to wilt and grapes resistant to *Phylloxera vastatrix*, as well as vegetables and flowers resistant to a number of other diseases and pests. There are citrus species unaffected by the Mediterranean fruit fly,

*Ceratitis capitata*; and gummosis is prevented by the use of certain orange stocks. Recently *Juniperus barbadensis* and *J. silicicola* have appeared to be resistant to the scale, *Carulaspis visci*, which has destroyed the native junipers. Clear instructions are given for dealing with plant refuse and tree wounds, and for roguing and the eradication of alternate host plants. Under cultural measures suggestions for crop rotations and for the manuring and protection of seedbeds are set out. Two of the more important examples of biological control cited are the introduction of the ladybird *Radolia cardinalis* for control of the scale, *Icerya purchasi*, and the control of the oleander scale, *Aulacaspis pentagona*, by *Aphelinus diaspidis*. The bulletin ends with an account of legislative control of diseases, pests and plant importations. C.W.S.H.

845. ROSS, A. A., AND KUSKIE, S. J.  
Horticultural districts of Queensland. 6.  
The Burnett and adjacent coast.  
*Qd agric. J.*, 1951, 72: 81-92, illus.

The climate, native vegetation and soils of this district are briefly described. Notes follow on the main horticultural crops, citrus, pineapples, bananas, macadamia nuts, passion fruit and rockmelons.

846. OZEROV, G. V.  
Hastening the germination of the seeds of certain plants. [Russian.]  
*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 10: 25-7, bibl. 2, illus.

The impermeability of the outer layer of olive seeds, hard-shelled almonds and lemon and orange pips retards germination. To hasten and improve germination the outer layer of the seed should be ruptured or completely removed in order to allow access of water and air to the kernel. Removing the pointed end of lemon and orange seeds is more effective than rubbing them in coarse sand. The germinating energy of orange seeds is higher than that of lemon seeds. The seeds of lemon and orange germinate better on coarse sand than on pinewood sawdust.

#### Avocadoes.

(See also 926b.)

847. HUME, E. P.  
Growing avocados in Puerto Rico.  
*Circ. P.R. fed. Exp. Stat. Mayaguez* 33, 1951, pp. 53, bibl. 138, illus.

Avocadoes of the West Indian type are grown extensively in Puerto Rico, though not as an orchard crop. The use of superior Guatemalan varieties and Guatemalan-West Indian hybrids should provide fruits more suitable for export as well as extending the season at which avocadoes are available locally. This circular includes information on the composition of the avocado flesh and oil and its dietetic value, climatic and soil requirements, varieties, nursery management, propagation, planting, cultivation, harvesting, yields, picking, packing and storage and diseases and pests, and also on the economics of production. Particular attention is paid to varieties, 19 of which are described, and to methods of propagation by different forms of budding and grafting.

848. SCHROEDER, C. A.  
The structure of the skin or rind of the avocado.  
*Yearb. Calif. Avocado Soc. for 1950*, pp. 169-76, bibl. 3, illus.

Avocado fruit skin consists of epidermis, hypodermis, chlorenchyma and sclerenchyma tissues. The structure of these tissues is described in detail and special attention is given to the density of the stomata. Varieties were shown to fall into stomatal density groups, Guatemalan varieties usually having fewer stomata than Mexican. High stomatal density round the fruit apex is considered to increase physiological activity in that area. C.W.S.H.

849. HALMA, F. F.  
Avocado rootstock investigations.  
*Yearb. Calif. Avocado Soc. for 1950*, pp. 136-8, illus.

Thirty-four plots have been planted for the testing of various rootstocks used in conjunction with Fuerte, MacArthur, Hass and Rincon avocados. Of 37 rootstock varieties used, 13 are Mexican, 22 Guatemalan and 2 West Indian. C.W.S.H.

850. HAAS, A. R. C.  
Rootstock influence on the composition of scion avocado leaves.  
*Yearb. Calif. Avocado Soc. for 1950*, pp. 149-52.

Calcium was the element which varied most in the leaves of a given scion variety when it was grafted on various Mexican rootstocks. With Fuerte avocado scions Guatemalan rootstocks tended to give higher calcium percentages in the leaves than Mexican rootstocks. C.W.S.H.

851. MONTGOMERY, H. W.  
Tip-graft observations.  
*Yearb. Calif. Avocado Soc. for 1950*, pp. 84-8, illus.

A method is described of tip-grafting seedlings developed from seeds sown in roofing paper containers. The seedling is grafted in October-December when 13-16 months old and the grafted plant is transferred to the field without disturbing the roots. C.W.S.H.

852. RÉGO, A. DA S.  
Transporte de mudas de abacateiro. (Transporting avocado trees [from the nursery].)  
*Rev. Agric. Piracicaba*, 1951, 26: 211-18, illus.

Transporting grafted avocado trees from the nursery in baskets involves great expense. A method of bench grafting was developed at the Itaipirema Experimental Station which allowed the newly grafted plants to be packed in boxes in moist sawdust and transported in this condition. They may remain in the boxes for 12-15 days. In this way the plants may be transported by air and the costs are very considerably reduced.

853. MURPHY, J.  
Frost protection.  
*Yearb. Calif. Avocado Soc. for 1950*, pp. 112-13.

An account is given of the use of a 220 h.p. wind machine at the top of an avocado orchard in hilly country. C.W.S.H.

## 854. HAAS, A. R. C.

Effect of sodium chloride on Mexican, Guatemalan, and West Indian avocado seedlings.

Yearb. Calif. Avocado Soc. for 1950, pp. 153-60, bibl. 8, illus.

Chlorine accumulation in the leaves results in leaf tip-burn. Root growth was retarded by lower concentrations of chlorine than was top growth. Chlorine accumulation increased with increasing age of leaves, and was higher in a Mexican and a Guatemalan variety than in a West Indian variety. C.W.S.H.

## 855. HAAS, A. R. C.

Calcium in relation to the effects of sodium in avocado seedlings.

Yearb. Calif. Avocado Soc. for 1950, pp. 161-8, illus.

Sodium burn is characterized by small, circular burned spots on the margin of the leaf and also scattered over the leaf. Pot experiments with Topa Topa (Mexican) seedlings showed that sodium accumulated in appreciable amounts in the leaves only when the concentration of calcium was low. C.W.S.H.

## 856. AYERS, A. D.

Salt tolerance of avocado trees grown in culture solutions.

Yearb. Calif. Avocado Soc. for 1950, pp. 139-40, bibl. 3, illus.

Pot experiments with NaCl, CaCl<sub>2</sub> and Na<sub>2</sub>SO<sub>4</sub> and observations in the field indicate that the leaf burn observed was due to the accumulation of injurious amounts of chloride and sodium in the leaves and not to physiological drought. Injury occurred, and high concentrations of chloride and sodium were found in the leaves, in situations where salt concentration in the soil was low. Salt tolerance of avocados was lower than that of other plants grown in the laboratory. C.W.S.H.

## 857. WALLACE, J. M.

Prevention of sun-blotch disease of avocados in new plantings.

Yearb. Calif. Avocado Soc. for 1950, pp. 97-100, illus.

It is considered that this virus disease can be prevented by the use of disease-free buds and rootstocks for young plantations. A transmission test method is described for determining whether the planting material to be used is infected or not. C.W.S.H.

## 858. ZENTMYER, G. A., AND POPENOE, W.

*Phytophthora cinnamomi* on avocado in Honduras.

Plant Dis. Repr., 1951, 35: 25.

*Phytophthora cinnamomi* was recently isolated from feeder roots of avocado trees in Tegucigalpa, Honduras. The roots were shipped under quarantine permit to Riverside, California, in September, 1950.—Univ. of Calif.

## 859. CONOVER, R. A., AND RUEHLE, G. D.

A study of diseases of avocado and mango and development of control measures.

A.R. Fla agric. Exp. Stat. for 1949-50, pp. 235-6.

In comparative trials SR-406 (Orthocide 406, containing 50% N-trichloro-methylthio tetrahydrophthalimide as active ingredient) appeared to be as effective in controlling anthracnose on mango as bordeaux mixture. Two fungicides, SR-406 and tribasic copper sulphate, used at the rate of 3 lb. to 100 gal. for the control of *Cercospora* spot of avocado, gave identical results, each allowing about 5% infected fruit.

## 860. PENCE, R. J., AND EBELING, W.

Orangeworms on avocados.

Yearb. Calif. Avocado Soc. for 1950, pp. 101-4, illus.

The orange tortrix, *Argyrotaenia citrana*, and the blastobasid moth, *Holcocera iceryaella*, have only recently been found to damage avocados. The orange tortrix attacks have been the more severe. Cryolite spray or dust is the recommended control measure on citrus. C.W.S.H.

## Citrus.

(See also 58, 318, 845, 926a, 1046o, 1079.)

## 861. FROST, H. B., AND CAMERON, J. W.

Frua and Dweet. Two new citrus varieties.

Bull. Calif. agric. Exp. Stat. 721, 1951,

pp. 10, illus.

Frua tangerine is a hybrid from King—which itself probably arose by crossing sweet orange with mandarin—pollinated by Dancy tangerine and is thought to be best adapted to Navel-orange districts. It has succeeded best so far worked on grapefruit, Cleopatra mandarin and sour orange. Sweet orange has not been tried as a stock and trifoliate dwarfs it. It throws nucellar seedlings. The fruit, which is described, is similar in flavour to that of Dancy. The Dweet tanger is a hybrid from Riverside of Mediterranean Sweet pollinated by Dancy. It has been fruited on sour orange and Cleopatra mandarin rootstocks and is now being tried on sweet orange and trifoliate. Its fruit are of orange size and of tangerine flavour. Botanical descriptions and coloured illustrations are given of both varieties.

## 862. HALMA, F. F.

Campbell Valencia—budded or seedling tree?

Calif. Citrogr., 1951, 36: 518-20, illus.

A method is described by which a root cutting was obtained and propagated from the original Campbell Valencia tree. The cutting was required to determine whether this 70-year-old tree was a budded or seedling tree. The root cutting progeny was obtained by first grafting a 4-6 in. root piece with a leafy lemon twig. Only one of 12 such rooted pieces produced shoots from the root portion and this success was attained when the scion was removed 6 years after grafting. C.W.S.H.

## 863. MONSELISE, S. P.

Light distribution in citrus trees.\*

Repr. Bull. Res. Coun. Israel, 1951, 1: 36-53, bibl. 19.

The author describes his apparatus including a German selenium cell Lange of the type S60, with a galvanometer calibrated in metre candles or lux, giving results

\* Being part of a doctor's thesis presented to the senate of the Hebrew university.



which agree with those given by a Weston illuminometer. The observations were made at Rehovot. He summarizes his work thus: "The distribution of light in the leafy top of citrus was investigated by means of a Selenium barrier-layer photocell. Measurements taken with the cell held parallel to leaf blades enabled us to draw extensive frequency histograms of leaf illumination on different days, and at different hours and exposures. Measurements taken with the cell held horizontally and upwards proved useful in the investigation of the illumination of different locations in the interior of tops of citrus trees. Clementine mandarin and Marsh Seedless grapefruit trees were found to have a significantly denser leafy top than Shamouti orange trees. As a consequence of thinning of overcrowded groves, light conditions were found to be highly improved, and yield per tree was greatly enhanced. Owing to the high shade-tolerance of their shade-leaves, citrus trees may be termed 'sciophilous trees' at least in regard to their vegetative stage of growth. Full sunlight is nevertheless required for obtaining the maximum yields."

864. SAUER, M. R.

**Growth of orange shoots.**

*Aust. J. agric. Res.*, 1951, 2: 105-17, bibl. 8.

Examination of Valencia and Navel orange shoots showed that in spring these were of five types: flowers but no leaves, flowers and a few small leaves, several flowers and large leaves, leaves and a solitary flower, leaves only. Flushes of growth occurred in July (spring), December and February. Flowering shoots were not common in summer growth. Leafy inflorescences set more fruit than leafless inflorescences and produced more shoots. Thus the most desirable type of tree is one which produces a high proportion of vegetative shoots and leafy inflorescences. Most shoots were produced from apical nodes. A high proportion of new shoots produced on inflorescences were vegetative, and the majority of inflorescences were produced on vegetative shoots. There is thus a tendency for alternation between vegetative and floral shoot populations and this is more marked in Valencia oranges. The tendency of a shoot to produce either vegetative or floral shoots is, however, modified by the current shoot population.—Commonwealth Res. Station, Merbein. C.W.S.H.

865. HAAS, A. R. C.

**Effect of length of day on the growth of orange trees.**

*Calif. Citrogr.*, 1951, 36: 395, 416, bibl. 5, illus.

Small Valencia orange trees on sweet orange stocks showed improved growth and appearance when they received artificial light from 5 p.m. to 7 a.m. from 100-watt white tubes. C.W.S.H.

866. CELJNIKER, JU. L.

**The physiological causes of the growth rhythm in trees. [Russian.]**

*Bot. Zhurnal*, 1950, 35: 445-60, bibl. 30.

Experimental data recorded for lemon, orange, and apple show that the rhythm of the growth processes is closely bound up with the metabolic rhythm in the meristem of the growing point of the shoots. This connexion comprises the accumulation of nucleic

acid before the beginning of growth, and its diminution at the time of visible growth. Noticeable lowering of nucleic acid initiates an arrest of growth even though other conditions are favourable.

867. BITTERS, W. P., AND BATCHELOR, L. D.

**Effect of rootstocks on the size of orange fruits.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 133-41, bibl. 17.

The size of the fruit produced by Washington Navel trees on 32 stocks and by Valencia trees on 26 stocks was recorded during three seasons. Different rootstocks produced wide variations in fruit size with both oranges; but seasonal variations, though large with the Washington Navel, were insignificant with Valencia oranges. Sweet orange stocks produced small fruit. With Valencia oranges, trees on sour orange stocks also produced small fruit. Trifoliate orange stocks produced large fruit; grapefruit stocks produced average fruit; and Rough lemon and Tangelo stocks produced fruit a little larger than those from sweet orange stocks. Several mandarin stocks produced small fruit. Seasons had different effects on the relative size of fruit produced by various stocks. Varieties of different species of rootstock differed among themselves in their effects on fruit size. There was no consistent relationship between number of fruits per tree and fruit size, or between fruit size and fruit number per unit size of tree. Trifoliate stocks produced large fruit and a large number of fruit per unit size. C.W.S.H.

868. ANON.

**Rootstocks affect lemon fruit quality.**

*Calif. Citrogr.*, 1951, 36: 439, 460, bibl. 5.

Eureka lemons on Rough lemon stock had less juice, soluble solids, citric acid, and ascorbic acid than fruit from trees on sweet orange, sour orange, grapefruit, Sampson tangelo or Cleopatra mandarin stocks. Lemon fruits from trees on Sampson tangelo stock had high juice content, soluble solids, and acidity. The grower is advised to select rootstocks which induce high juice content, and a high concentration of citric acid.

869. BITTERS, W. P., AND BATCHELOR, L. D.

**Rootstock recommendations for California citrus.**

*Calif. Citrogr.*, 1951, 36: 488, 507-11, bibl. 6.

A number of factors, among which quick decline disease and the demand for juice concentrates and high quality fruits are most important, have produced changed ideas as to the value of the commonly used rootstocks. A useful table is given showing the main factors to be considered in the choice of common rootstocks. These rootstocks are also discussed individually in their relation to the particular citrus crops and to disease, soils, quality, yield, etc. Sweet orange is still recommended for lighter, virgin soils. Sour orange is recommended for lemons on heavy soils. Rough lemon is no longer favoured. Grapefruit stocks are only likely to be valuable for lemons. The effects of trifoliate orange stocks have been variable and they should at present only be used for oranges. Cleopatra mandarin, resistant to gummosis, is very promising and is recommended for commercial trial. Sampson

tangelo is only useful for lemons owing to quick decline. Troyer citrange is still in the experimental stage.

C.W.S.H.

870. ANON.

Progress report on "a major operation".

*Calif. Citrogr.*, 1951, 36: 489, illus.

An account is given of the grafting of Navel orange scions onto the stumps of seedling oranges which were over 80 years old. By the end of the third growing season the grafts had made exceptionally fast growth, but the growth rate was slowing down somewhat and it was expected that trees of normal height would be produced and would come into bearing earlier than with other methods of top working.

C.W.S.H.

871. COOPER, W. C., AND OLSON, E. O.

Influence of rootstock on chlorosis of young Red Blush grapefruit trees.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57:

125-32, bibl. 9, illus.

An experiment was carried out on calcareous fine sandy loam soil in Texas to determine the effect of various rootstocks on leaf chlorosis of grapefruit trees. Chlorosis induced by excessive lime or excessive soil moisture is common in this area. Out of 36 rootstock varieties tried only Florida sour orange, Bittersweet sour orange, Sunki mandarin, and Rough lemon did not induce chlorosis in the grapefruit scion. Of other stocks some induced chlorosis in the autumn but not in spring, while the remainder induced slight or severe chlorosis in both seasons.

C.W.S.H.

872. MES, M. G.

Cuttings difficult to root.

*Brooklyn bot. Gdn Rec.*, 1951, 7: 95-7, illus.

Cuttings of sour orange form only a few roots at the extreme base, those of citron form them over the whole area of stem covered by the rooting medium. A simple experiment is described and illustrated in which bark cylinders (scions) taken from attached twigs (stock) of both plants were interchanged and securely tied with raffia or rubber bands. After several months these grafted twigs were cut off at the base of the graft, treated with indoleacetic acid and were rooted. The citron bark cylinder on the sour orange cutting formed numerous roots, just as if it had no connexion with the sour orange shoot, while the sour orange cylinder formed only the characteristic odd roots at the base. The described treatment may be applied to other types of cuttings which are difficult to root.

873. JONES, W. W., AND PARKER, E. R.

Seasonal trends in mineral composition of Valencia orange leaves.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 101-3, bibl. 6.

The percentages of nitrogen, phosphorus and potassium in Valencia orange leaves decreased, and the percentages of calcium, magnesium and sodium increased with age until midwinter.

C.W.S.H.

874. COELHO SOUZA, W. W.

Culturas permanentes. Restauração dos pomares. (Permanent crops. Restoration of [citrus] orchards.)

*Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 549-53.

The principal measures recommended for restoring fertility to citrus orchard soils in Brazil are the construction of contour ditches and cover cropping with legumes.

875. HARDING, R. B., AND CHAPMAN, H. D.

Progress report on a study of soil characteristics in forty high-performance orange orchards in California.

*Proc. Soil Sci. Soc. Amer.*, 1950, 15: 243-8, bibl. 6, being *Pap. Calif. Citrus Exp. Stat.* 676.

Low salinity conditions were found in the soils of practically all of a group of 40 of the highest yielding orange orchards in California. There was, however, quite a wide range of pH, free lime, texture, depth and origin of these soils. The limits of chemical, physical and biological soil conditions compatible with optimum citrus performance have not yet been determined.

876. PARKER, E. R., AND JONES, W. W.

Effects of fertilizers upon the yields, size and quality of orange fruits.

*Bull. Calif. agric. Exp. Stat.* 722, 1951, pp. 58, bibl. 59, illus., being *Pap. Univ. Calif. Citrus Exp. Stat.* 657.

This is a progress report on the first 22 years of a complex long-term fertilizer experiment with Washington Navel orange trees on sweet orange stock. The results obtained during the first 12-year period were published in 1943 [see *H.A.*, 14: 302] and are here summarized in connexion with subsequent observations on yield, fruit size, commercial grade of fruit and other factors. The results showed that nitrogen fertilizers and bulky organic manures were the only materials that increased yields. Maximum yields and fruit size were obtained from an annual application of 3 lb. N per tree (half from a concentrated fertilizer and half from manure) together with winter cover cropping. Some chemical sources of N were found to be detrimental if continuously used in large quantities as the only fertilizer, but their harmful effects were counteracted by the application of bulky organic manures and winter cover crops. Potassium fertilizers and bulky organic materials increased fruit size. Cover crops frequently increased both yields and fruit size. None of the fertilizer programmes used appreciably affected the commercial grade of the fruit.

877. COONY, J. J., AND ALDRICH, D. G.

Citrus trees—on some soils—need phosphate fertilizers.

*Calif. Citrogr.*, 1951, 36: 486, 502-4, bibl. 4, illus.

A deficiency of phosphate for lemons and oranges has been shown in San Diego county on terrace and upland soils with dense clay subsoils, and on some granite and calcareous soils. Applications of 3-5 lb.  $P_2O_5$  per tree lead to 20-60% yield increases. Leaves in phosphate deficient areas are pale green when young and may be bronzed and have typical leaf spots when older. Leaf analyses seem likely to prove reliable guides to deficiency.

C.W.S.H.

878. CHAPMAN, H. D., AND RAYNER, D. S.

Effect of various maintained levels of phosphate on the growth, yield, composition, and quality of Washington Navel oranges.

*Hilgardia*, 1951, 20: 325-58, bibl. 32, illus.

Washington Navel orange trees on sour orange root-stock were grown out of doors in large-sized, aerated solution cultures maintained at phosphorus levels ranging from 2.5-3.5 to 150-175 p.p.m.  $\text{PO}_4$  for a period of nine years. These levels of phosphate made it possible to determine the effects of two degrees of phosphate deficiency and of phosphate levels in excess of plant needs, on tree growth, appearance, behaviour, yield, quality of fruit, disease and insect infestation, and foliage composition. The main findings are briefly covered in the preceding section. [Authors' summary.]

879. CHAPMAN, H. D.  
**Nitrogen needs of citrus.**

*Calif. Agric.*, 1951, 5: 6: 6.

The crop removes only 40-60 lb. N per acre but applications of 200-400 lb. per acre have been found necessary to maintain yields. Losses of N have been due to irregular root distribution, leaching during winter rains and volatilization. Volatilization has been increased by heavy phosphate applications given in the past. It is suggested that N losses can be reduced by acidifying neutral or alkali soils, non-cultivation to improve structure, frequent small N doses, sprinkler irrigation and periodical soil nitrate tests to detect excessive concentrations (over 5 p.p.m. nitrogen as nitrate in dry soil). C.W.S.H.

880. SPURLING, M. B.  
**Sprinkler irrigation of citrus.**

*J. Dep. Agric. S. Aust.*, 1951, 55: 26-33, bibl. 1, illus.

The sprinkler method of irrigating citrus is described under: block design, cultural practices, fertilizer application, choice of a sprinkler system, application rate of sprinklers, precipitation pattern of sprinkler heads, mechanical efficiency of the spray heads, general considerations, capital cost. Its advantages over furrow irrigation are: (a) easier design for efficient watering on undulating ground and light soils, (b) it permits sounder cultural practices and (c) it facilitates even manure distribution.

881. DAVISON, R. M., AND CEDERMAN, J. A.  
**Hormone sprays to reduce pre-harvest drop of sweet oranges.**

*Orchard. N.Z.*, 1951, 24: 2: 3-4.

The results of trials on Washington Navel oranges have shown that a single spray of 20 p.p.m. sodium 2,4-D will arrest fruit drop once it has begun and reduce further loss for a period of at least two months.

882. JONES, L. T.  
**Spraying to control pre-harvest drop in Washington Navel oranges.**

*J. Agric. W. Aust.*, 1951, 28: 72-6, bibl. 1.

A 2,4-D spray at 20 p.p.m. had a marked effect in arresting pre-harvest drop of Washington Navel oranges. Treated trees lost an average of 8.3% as windfalls, untreated 26.2%. Windfalls from the untreated trees were mostly sound fruit, those from the treated trees mostly unsound and mouldy. This means that the spray kept the separation layer immature, and the fruit that fell did so because it rotted and pulled away from the stalk. If only sound windfalls had been counted the difference due to treatment would have been accentuated. The cost of the 2,4-D material used in this trial was about a penny per tree;

the windfalls saved would amount to about a case per tree.

883. HARDISON, E. D.  
**A grower's observations of frost protection by use of a blower.**

*Yearb. Calif. Avocado Soc. for 1950*, pp. 106-11.

An account is given of experience with a "double-header" type blower with two 320 h.p. engines on a 40 ft. tower for the protection of a 35 acre citrus orchard. The author concluded that they are still "in an early stage of development". C.W.S.H.

884. ANGUS, D. E.  
**Trials of an inclined axis fan in the protection of citrus orchards from frost.**

*Sect. Rep. C.S.I.R.O. Sect. meteor. Physics* 1, 1951, pp. 24.

The author summarizes results of these trials at Griffith in the Murrumbidgee Irrigation Area, N.S.W., as follows: "In the winter of 1950 further trials were carried out on the protection of citrus orchards from frost by means of fans. In these trials the type of fan previously used was modified to provide a variable tilt of the axis to the vertical. The distribution of temperature rise in the orchard due to the fan was investigated for different angles of tilt. A progressive increase was found in both the area and the range of the 2° F. temperature rise as the axis of the fan was tilted up to its maximum of 62° from the vertical. The results encourage a belief that further benefit may be obtained when the tilted fan unit is rotated about a vertical axis."

885. BROOKS, F. A., RHOADES, D. G., AND SCHULTZ, H. B.  
**Frost protection for citrus.**

*Calif. Agric.*, 1950, 4: 9: 11-12, 15, illus.

Citrus growers consider that wind machines plus 25 heaters per acre can provide a satisfactory frost protection system. Tests at the Citrus Experiment Station showed that wind machines alone or heaters alone raised temperatures by 2.1° F. and 1.7-1.8° F. respectively, but that when both were used together temperatures were raised by 4.8-5.0° F. C.W.S.H.

886. KEPNER, R. A.  
**Effectiveness of orchard heaters.**

*Bull. Calif. agric. Exp. Stat.* 723, 1951, pp. 30, illus.

A detailed report is given of the methods used and the results obtained in orchard heating studies made during the period 1937-42 by the Agricultural Engineering Division of the University of California College of Agriculture in citrus orchards in southern California. Heat transfer processes and the effectiveness of 9 kinds of heater were studied. The results have been summarized in *Circ. Calif. Exp. Stat.* 400 [see H.A., 21: 2891].

887. RYNDIN, N. V.  
**The covering and overwintering of citrus in the Crimea.** [Russian.]

*Sad i Ogorod*, 1951, No. 9, pp. 40-5.

The best method of cultivating lemons and oranges in the Crimea is to grow them in trenches, but raised banks ("ramparts") must be used in the early years.



In the steppe and foothill parts of the Crimea, citrus varieties are grown in deep trenches which can be covered in winter in various ways for protection from frost. In the Yalta region citrus bushes are sometimes grown in "half-trenches" (0-6 m. deep), and sometimes in the open. Lemons and oranges in half-trenches are usually covered in winter with two layers of matting or with frames. Data are tabulated for temperatures in January and February for open ground, under muslin covers, with raised banks, in half-trenches and in deep trenches.

# 888. IVAŠČENKO, A. I.

**Trials in the Lenkoran co-operative farms for the winter protection of citrus.** [Russian.]

*Sad i Ogorod*, 1951, No. 9, pp. 46-9, illus.

On certain co-operative farms of the Lenkoran-Astara region (south-east Azerbaijan, U.S.S.R.) on the shores of the Caspian Sea, in addition to the usual methods recommended for protecting young citrus plants in winter, another method is being tried. Small tents are constructed from rods covered with muslin, sacking, straw, reeds, or matting, and the bases of the stems are covered with sand and soil. After the severe frosts of 1949/50 it was found that when the covering was thick enough the plants suffered no injury. Various forms of tent are shown.

# 889. JEPSON, L. R.

**Ridge deformities of lime fruit.**

*Calif. Citrogr.*, 1951, 36: 397, illus.

Some limes are rejected for shipment by packing houses owing to ridges and hook-like protuberances on the fruit. These were thought to have been caused by the citrus bud mite which was found to infest up to 1% of the buds. A spray of Aramite wettable powder prevented bud infestation by the mite, but did not, however, reduce the percentage of ridged fruit. It was found that the ridges and protuberances were due to the failure of stamens to separate from the ovary on young fruit, and that such deformed flowers were formed during damp weather. *Botrytis* and *Alternaria* fungi were also found associated with these flowers.

C.W.S.H.

# 890. SUIT, R. F.

**Parasitic diseases of citrus in Florida.**

*Bull. Fla agric. Exp. Stat.* 463, 1949, pp. 112, illus. [received 1951].

After a general discussion of spraying and fungicides, 21 diseases caused by parasitic fungi, bacteria and viruses, 5 by algae, lichens and parasitic and epiphytic flowering plants, and 2 decline disorders (citrus nematode and water damage) are described, with advice on control.

# 891. GRANT, T. J., AND OTHERS.

**Investigações sobre a tristeza dos Citrus.**

VI. Alguns estudos fisiológicos sobre a moléstia. (Investigations on tristeza disease of citrus. VI. Some physiological studies.) [English summary  $\frac{1}{2}$  p.]

*Bragantia*, 1950, 10: 49-59, bibl. 1.

Experiments were carried out at the Instituto Agrônomico, Campinas, to determine the effects of environmental conditions on the symptom expression of tristeza, and the effects of the disease on transpiration and chemical composition of the plant. In tests using

potted plants of the orange variety Barão on sour orange stock, tristeza symptoms appeared in 8-10 weeks after inoculation on plants grown in standing water or on those having a daily application of 200 c.c. water, whereas they did not appear for 28 weeks on plants receiving only 50 c.c. water daily. Under continuous heavy shade healthy and inoculated plants showed practically no growth and no tristeza symptoms. With increased light growth of healthy plants increased progressively but growth of inoculated plants increased only for the first month. These results indicate that conditions favourable to rapid growth also favour early symptom expression, and that stunting is one of the principal characteristics of the disease. The transpiration of healthy plants was  $2\frac{1}{2}$  times as great as that of diseased plants. There were some differences in the percentages of CaO and Na<sub>2</sub>O in the leaves and stems of diseased and healthy plants. The differences in the amount of chemicals present in the root systems of diseased and healthy plants were comparatively small, although in all cases except for MgO the quantities were larger in the healthy than in the diseased roots. Preliminary field tests with minor elements indicated that applications of zinc sulphate were beneficial to diseased plants, but no beneficial effects were observed from spray applications made under controlled conditions. Attempts to inactivate the tristeza virus in budwood by immersion in hot water were unsuccessful at all the temperatures and exposure periods tested. Nine chemicals were tested for inactivation of the virus but none of them was effective.

# 892. TERRA, G. J. A.

**A virus disease as the cause of incompatibility of citrus rootstocks in Java.**

*Indones. J. nat. Sci.*, 1951, 107: 17-24, bibl. 18, illus.

Recent investigations on tristeza disease have thrown new light on the problem of citrus incompatibility which has long been prevalent in Java [see H.A., 6: 831]. It appears probable, from experiments carried out there, that tristeza is endemic in all citrus regions of Indonesia and that various strains of the virus may occur. The results suggest that varieties which show a high incompatibility with various stocks, as a result of tristeza, may themselves be valuable as stocks.

# 893. WALLACE, J. M.

**Recent developments in studies of quick decline and related diseases.**

*Phytopathology*, 1951, 41: 785-93, bibl. 16, illus.

West Indian (Mexican) lime seedlings develop diagnostic foliage symptoms within 4 to 6 weeks of inoculation with the quick-decline virus. This provides a short-time test that finds many uses in studies of this disease. The use of lime seedlings as indicators will be of particular value in insect-vector studies.—Citrus Experiment Station, Riverside, California.

# 894. DUCHARME, E. P., KNORR, L. C., AND BANFI, A.

**La presencia del "stem pitting" en la Argentina. (The occurrence of stem pitting in Argentina.)**

*Idia*, 1951, 4: 37/39: 15-20, bibl. 5, illus.

\* Or *Madjalah ilmu alam untuk Indonesia*, formerly *Chronica Naturae*

Stem pitting of grapefruit trees, considered to be a virus, has recently become a serious threat to the grapefruit industry in South Africa [see *H.A.*, 19: 3369]. Recent observations made in Entre Rios, Corrientes and Misiones suggest that it is also present in Argentina. The symptoms, which are here described and illustrated, are identical with those reported from South Africa. The varieties affected are also the same, Marsh Seedless being principally attacked. The yield of affected trees is not seriously reduced, but the fruit is smaller and has a higher acid content than that of healthy trees. This does not affect its market value so seriously in Argentina as in South Africa. Tables are given showing the percentage of infection in 12 orchards in the Mesopotamia district of Argentina and the effect of the disease on yield. The relation of stem pitting to tristeza disease is discussed. It is of interest to note that stem pitting only occurs in Argentina in those districts where tristeza is present.

895. KNORR, L. C., AND DUCHARME, E. P.  
The relationship between Argentina's lepra explosiva and Florida's scaly bark, with implications for the Florida citrus grower. *Plant Dis. Repr.*, 1951, 35: 70-5, illus.; and *Anotaciones sobre lepra explosiva. (Notes on lepra explosiva.)* *Idia*, 1951, 4: 42/3: 32-8, illus.

A review of the similarities (tabulated) leads to the conclusion that in their fundamental characters the lepra explosiva in Argentina and Florida scaly bark of citrus are synonymous. Differences do exist in the disease as it occurs in Argentina and in Florida, but these are minor, pertaining only to slight variations in the size, zonation, and number of spots on leaves, twigs, and fruit, and to the host range other than on citrus. The disease is associated in some way with a mite of the genus *Brevipalpus*. It is not clear whether the mite itself causes the lesions by the injection of a toxin or whether the mite functions as the vector of a virus, but it is certain that mites induce it, and that control is obtained wherever sulphur sprays or dusts are employed.—Tristeza Laboratory, Concordia, Entre Rios, Argentina. [See also *H.A.*, 20: 1022.]

896. KOZLOVA, V. I.  
Scaly bark of citrus and measures to prevent its spread. [Russian.] *Doklady vsesojuz. Akad. sel'sk. Nauk*, 1951, 16: 7: 36-40.

From the symptoms and his grafting experiments the author concludes that the scaly bark disease of citrus is identical with the virus disease "Psorosis".

897. BLISS, D. E.  
The destruction of *Armillaria mellea* in citrus soils. *Phytopathology*, 1951, 41: 665-83, bibl. 15, illus.

In field and laboratory tests best results were obtained from the use of chloropicrin, carbon disulphide, and ethylene oxide. Carbon disulphide, although relatively low in toxicity, was best suited for use against the fungus in the orchard because of its high vapour pressure and its ability to penetrate deeply into soil. The other two fumigants presented problems of application: ethylene oxide, because of its low boiling

point; chloropicrin, because of its low vapour pressure. It is concluded that when the fumigant is applied to orchard soil at the usual rate (302 gal. per acre) the destruction of *Armillaria* is due primarily to the antibiotic action of *Trichoderma*.—Univ. of Calif.

898. SUIT, R. F., AND STEARNS, C. R., Jr.  
Investigations of melanose and stem-end rot of citrus fruit. *A.R. Fla agric. Exp. Stat. for 1949-50*, pp. 146-7.

The various copper fungicides applied to two varieties of orange and one of grapefruit were about equally effective in controlling melanose, *Diaporthe citri*. Late treatment with copper sprays was, however, found to be undesirable. It appears that copper, applied to fruit on which melanose lesions are present, stimulates the young lesions to produce excessive callus or corky tissue, which results in copper injury termed star melanose.

899. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.  
The citrus gall wasp (*Eurytoma fellis*). *Agric. Gaz. N.S.W.*, 1951, 62: 254-5.

This small native wasp, which develops in various kinds of wild citrus, is a common pest of cultivated citrus on the north coast of New South Wales. The injury is particularly serious in nursery stocks, as the main stems may become infested and distorted. The systematic cutting off and destruction of the galls is recommended; all should be removed by the end of August and burnt.

900. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.  
The bronze orange bug (*Rhoecocoris sulci-ventris*). *Agric. Gaz. N.S.W.*, 1951, 62: 301-2, illus.

The life history and habits of this bug are described. The most satisfactory insecticides for use against it during winter are DDT and soft soap. For spring spraying DDT or HCH can be combined with the routine bordeaux mixture or copper oxychloride sprays.

901. FREZAL, P.  
Nouvelles observations sur le comportement de la mouche Méditerranéenne dans les orangeries et les moyens de l'y combattre à l'automne. (New observations on the habits of the Mediterranean fruit fly in orange groves and autumn control measures.) *C.R. Acad. Agric. Fr.*, 1951, 37: 59-64.

The results obtained indicate that sprays were better than dusts and that DDT was superior to SNP.

902. ATKINS, E. L., Jr.  
Control of orangeworms. *Calif. Agric.*, 1951, 5: 6: 4, 15.

The four commonest orangeworms, which feed on peel and pulp, are: the orange tortrix (*Argyrotaenia citrana*); pyroderces (*Pyroderces rileyi*); holcocera (*Holcocera iceryaella*); platynota (*Platynota stultana*). These insects can be controlled by cryolite, DDD and parathion. Cryolite is slow-acting and does not kill pyroderces. DDD and parathion kill all species but with parathion the fruit must not be picked for 30 days

after application. Treatment is usual before mid-June but autumn treatment may be desirable; in this case DDD or cryolite may be added to the regular oil spray for scale insects, provided the approval of the manufacturer of the particular oil used is obtained. [Similar to paper in *Calif. Citrogr.*, 36: 270; *H.A.*, 21: 294.]  
C.W.S.H.

903. FLESCNER, C. A., AND BADGLEY, M. E.  
**Natural control of the citrus rust mite.**

*Calif. Citrogr.*, 1951, 36: 396, bibl. 6, illus.

Damage by the citrus rust mite (*Phyllocoptruta oleivora*) was much increased on trees sprayed with a DDT-Neotran mixture owing to the elimination of the mite's natural enemies—three genera of dusty wings, *Parasemidalis*, *Conioptery* and *Conwentzia*, and a predaceous mite of the Laelaptidae. In the last decade there has been an increase in the distribution of the rust mite, and it is considered that the rate of spread and the increasing severity of infestation is connected with the development of certain pest control practices.

C.W.S.H.

904. JEPSON, L. R.

**Bis-(p-chlorophenoxy)-methane in relation to the control of citrus red mite and other mites injurious to citrus in California.**

*J. econ. Ent.*, 1951, 44: 328-37, bibl. 18, being *Pap. Calif. Citrus Exp. Stat.* 665.

The effectiveness of bis-(p-chlorophenoxy)-methane (K-1875) was studied for the control of 5 species of mite. A formulation containing 1 lb. of technical K-1875 dissolved in dimethylnaphthalene-kerosene mixture and emulsified with blood-albumin spreader was as effective in control of citrus red mite, *Paratetranychus citri*, as the conventional petroleum oil sprays. Results obtained by other formulations, such as wettable powder and dust, and by different methods of application, are also recorded. Both in laboratory and field trials high temperatures increased the rate at which K-1875 deposits lost their toxicity to citrus red mite. K-1875 was effective only under certain conditions against the six-spotted mite, *Tetranychus sexmaculatus*, and the Lewis mite, *T. lewisii*, and was unsatisfactory in control of the citrus bud mite, *Aceria sheldoni*, and the citrus rust mite, *Phyllocoptruta oleivora*. No plant injury has been observed as a result of applications.

905. LATIF, A., AND YUNUS, C. M.

**Food-plants of citrus leaf-miner (*Phyllocnistis citrella* Stn.) in the Punjab.**

*Bull. ent. Res.*, 1951, 42: 311-16, bibl. 8.

It is shown that the true food-plants of this pest are the various species of *Citrus* and *Aegle marmelos*. Elephant lemon, *Citrus medica*, which has comparatively succulent leaves, is the most susceptible species of *Citrus*, whilst lime, *C. aurantiifolia*, with its comparatively thick and coarse leaves, is the least susceptible. The infestation of *Aegle marmelos* during these observations was negligible. *C. medica* should be excluded from citrus orchards as it is of no great economic importance, and is, as stated, highly susceptible to attack. Lemon, *C. limonia*, usually grown as a hedge around gardens, provides an undisturbed breeding ground for the miner and should as far as possible not be planted around citrus plantations. [From authors' summary.]

906. GRIFFITHS, J. T., JR., AND THOMPSON, W. L.  
**Identification of Florida red and purple scales on citrus trees in Florida.**

*Circ. Fla agric. Exp. Stat.* S-5, 1949, pp. 13, bibl. 3, illus. [received 1951].

Ways are mentioned of identifying living scales and recognizing the stages in the life cycle of purple scale, *Lepidosaphes beckii*, and of Florida red scale, *Chrysomphalus aonidum*. Methods for making counts of scales in order to determine the extent and intensity of an infestation are outlined.

907. THOMPSON, W. L., AND GRIFFITHS, J. T., JR.  
**Purple scale and Florida red scale as insect pests of citrus in Florida.**

*Bull. Fla agric. Exp. Stat.* 462, 1949, pp. 40, bibl. 78, illus. [received 1951].

Two scale insects, purple scale, *Lepidosaphes beckii*, and Florida red scale, *Chrysomphalus aonidum*, have been serious pests in Florida for many years. The life cycle of both is set out and illustrated. The adverse effects of scale infestations on citrus are discussed and the factors affecting the relative abundance of scales on citrus trees are considered in detail, with an account of the role played by parasites and predators. Where single oil sprays are to be used for control a 1-3% oil emulsion should be applied between 15 June and 31 July. Where serious infestations are not a factor, early and mid-season fruit should be sprayed before late oranges and grapefruit.

908. EWART, W. H., AND ELMER, H. S.

**Parathion for control of Citricola scale.**

*Calif. Citrogr.*, 1951, 36: 420-2.

Parathion was applied as a 25% wettable powder suspension in water and as 1% and 2% dusts. The sprays gave thorough coverage or outside coverage only. All methods gave good control with late summer and autumn applications. In late winter, early spring and in the early summer hatching period (late April to June), the outside coverage and dust treatments were not sufficiently effective for commercial usage. Only 0.5 p.p.m. of parathion was recovered from the peel of fruits which had undergone effective treatment. High populations of soft brown scale (*Coccus hesperidum*) have been associated with these parathion applications, indicating that the treatment has killed the natural parasites of this scale.

C.W.S.H.

909. CARMAN, G. E., AND OTHERS.

**Parathion for citrus pests in Southern California.**

*Calif. Citrogr.*, 1951, 36: 487, 504-6.

Field trials have shown that parathion can control many major pests of citrus among which are six scale insects, the citrus thrips, and four orangeworms. Its control of mealybugs is also promising. Parathion can be used with most insecticides commonly used for citrus, but not with highly alkaline sprays. Suggested precautions in its use are given. Applied as a wettable powder parathion has only caused leaf fall in a few cases, but leaf drop is increased when it is added to petroleum oil sprays. Addition of 2,4-D may counteract this effect. There are no marked effects on the fruit. Parathion has not been detected in the pulp portion of sprayed fruit, but expressed peel oils have



contained up to 400 p.p.m. Parathion spraying may increase the incidence of soft scale, *Coccus hesperidum*, as the result of its effect on parasites and predators.

C.W.S.H.

910. BARTLETT, B., AND EWART, W. H.  
Effect of parathion on parasites of *Coccus hesperidum*.  
*J. econ. Ent.*, 1951, 44: 344-7, bibl. 4, being  
*Pap. Calif. Citrus Exp. Stat.* 668.

Serious increases of soft (brown) scale, *Coccus hesperidum*, have been caused by parathion applications to citrus trees. Re-establishment of *Metaphycus luteolus*, its most effective parasite, in groves after parathion residues have dissipated, resulted in rapid biological control of the scale.

911. DeBACH, P., AND BARTLETT, B.  
Effects of insecticides on biological control of insect pests of citrus.  
*J. econ. Ent.*, 1951, 44: 372-83, bibl. 18,  
being *Pap. Calif. Citrus Exp. Stat.* 666.

Literature on inter-relationships between insecticidal and biological control of citrus pests is reviewed. Chemical treatments applied to citrus trees against specific pests have resulted in increases of pests such as aphid, citrus mealybug, yellow scale, soft brown scale, two-spotted mite, orange tortrix, cottony-cushion scale, citrus red mite, long-tailed mealybug, and California red scale. Increases in cottony-cushion scale after DDT treatment have been shown to be caused by a differential toxicity to the scale and its predator, vedalia. Increases in citrus red mite after applications of DDT, cryolite, and zinc sulphate were related to the deleterious effects of these materials upon predators. Increases in populations of long-tailed mealy bug were prompted by applications of chlordane, cryolite, zinc sulphate, bis-(c-chlorophenoxy)-methane (K-1875) talc, and light dosages of DDT. The upset of natural control of California red scale was experimentally demonstrated where a selective advantage was given the host over the parasite by light DDT dosages. The effectiveness of natural enemies in the absence of treatment, and the long range effects of insecticidal treatment on beneficial insects, are discussed. [From authors' summary.]

912. WASON, E. J.  
Use of bordeaux and fumigation for citrus.  
*Agric. Gaz. N.S.W.*, 1951, 62: 361.

Injury to citrus trees will occur if they are fumigated following spraying with bordeaux mixture, but zinc sulphate may be added to bordeaux mixture to obviate this injury. Tests have shown that the standard zinc-bordeaux mixture, followed by fumigation, has not caused any tree damage. The use of zinc-bordeaux prior to fumigation does not reduce the effectiveness of the hydrocyanic gas as a scale fumigant.

913. TURRELL, F. M., AND SCOTT, F. M.  
Effect of elemental sulfur dust on growth of citrus leaves, and its relation to the buffer capacity of the leaf-tissue fluid.  
*Amer. J. Bot.*, 1951, 38: 560-6, bibl. 33,  
being *Pap. Univ. Calif. Citrus Exp. Stat.*  
*Riverside* 680.

Applications of 325-mesh dusting sulphur weekly throughout one growing season, to trees of Marsh

grapefruit, Eureka lemon, Valencia and Washington Navel orange, caused abscission of grapefruit and lemon leaves and reduced their growth in length, but increased growth of Valencia and Washington Navel orange leaves. Reduced growth of sulphur-dusted leaves was correlated with small buffer capacities of the leaf-tissue fluids, and increased growth was correlated with large buffer capacities of these fluids. [Authors' summary.]

914. KLOTZ, L. J.  
Factors influencing the storage life of citrus fruit.  
*Calif. Citrogr.*, 1951, 36: 490, 514-15,  
bibl. 5.

Keeping quality of fruit is influenced before picking by variety, rootstock, nutrition and water availability. Valencia oranges on rough lemon stocks show a tendency to granulate. Copper deficiency leads to changes in pulp and rind and to splitting. Boron, zinc or iron deficiencies give rise to other symptoms. From harvest time storage life is influenced by treatment during harvest and handling and by storage conditions. Injuries or cold lead to the entry of various moulds and bacterial diseases. These are checked by the use of fungicides in treating tanks, a temperature of 115-120° F. being necessary to control *Phytophthora* spp. Lemons must be stored at 58° F. with humidity at 87%, or 82-84% near the coast. Ventilation and air circulation are important and CO<sub>2</sub> should not rise above 1%. Lemons are susceptible to *Alternaria citri* rot, but the use of 2,4-D or 2,4,5-T at respectively 500 p.p.m. or 200 p.p.m. in water wax emulsion delays maturation and reduces alternaria incidence. NCl<sub>3</sub> gas is also sometimes used.

C.W.S.H.

915. HOPKINS, E. F., AND LOUCKS, K. W.  
Citrus fruit decay studies—chemical treatments for the prevention of citrus fruit decay.  
*A.R. Fla agric. Exp. Stat. for 1949-50*,  
pp. 166-9, illus.

Nitrogen trichloride (Decco process) reduced stem-end rot in storage, but gave results of doubtful significance in reduction of total decay. Of the numerous other chemicals tried to control decay in citrus fruits, Dowicide A (sodium orthophenylphenate) was the most important.

916. HENDRICKSON, R.  
Florida citrus molasses. Clarification of citrus press liquor.  
*Tech. Bull. Fla agric. Exp. Stat.* 469, 1950,  
pp. 24, bibl. 10.

Of 5 methods examined sedimentation proved the best. Molasses obtained from the clarified press liquor gives promise, subject to careful manufacture and standardization, of being an outstanding carbohydrate concentrate.

## Dates.

(See also 58.)

917. NIXON, R. W.  
The date palm—"Tree of Life" in the subtropical deserts.  
*Econ. Bot.*, 1951, 5: 274-301, bibl. 23, illus.

An informative article introduced by notes on history, botany and utilization. Varieties are mentioned and the principal date-growing countries of the world, with their estimated number of trees, are listed. The only serious attempt to establish date culture in the Western Hemisphere has been made in the United States; there are now nearly 6,000 acres under cultivation in southern California and Arizona. Cultural, harvesting and drying methods employed there are compared with those of the old world. Pests and diseases and their control are noted.

918. NIXON, R. W.

**Date culture in the United States.**

*Circ. U.S. Dep. Agric.* 728, revised 1951, pp. 57, bibl. 91, illus.

This circular is intended primarily for the relatively inexperienced commercial date grower in the United States. It provides information on all the special environmental and cultural requirements of the date, including, among others, irrigation, pollination, handling and storing pollen, selection of male palms, protection of the fruit from rain, fumigation in the packing house, artificial ripening, composition of dates and on varieties.

919. NIXON, R. W.

**Leaf characters of the Deglet Noor date palm in relation to age and environment.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 179-85, bibl. 2, illus.

The leaf measurements of 12 palms of different ages growing in Algeria, California and Texas are tabulated. It is concluded that leaf characters, such as length, spine area and number, length and number of pinnae, vary widely according to age and environment. It appeared that leaf size reached a maximum at the age of 9-15 years and might continue at this maximum until the palm was over 40 years old. Reduction in spine number occurs earlier. That unfavourable conditions reduce leaf size was shown by the experimental defoliation of a palm in California. C.W.S.H.

920. BRADFORD, E. A. M.

**Date production in North Africa.**

*Food*, 1951, 20: 420-4, illus.

Mainly about the conditions under which dates are grown and their preparation for the export market.

### *Kaki.*

921. KÄHR, F.

***Diospyros kaki*. (The Japanese persimmon or kaki.)**

*Schweiz. Gärtnerztg*, 1951, Vol. 54, No. 20, p. 1, illus.

A note on *Diospyros kaki*, widely grown in the Ticino Canton of Italian Switzerland, and recommended for north of the Alps as an espalier against walls. The plants are stated to tolerate temperatures as low as  $-10^{\circ}$  to  $-12^{\circ}$  C. The variety "Netkaki" is the most widely grown and its fruit most highly valued. *D. virginiana* is used as rootstock.

922. BONGINI, V.

**Cancro del cachi da *Phomopsis diospyri* n.sp. (Canker of kaki caused by *Phomopsis diospyri* n.sp.)**

*Ann. Sper. agrar.*, 1951, 5: 273-81.

This new disease of kaki appears in two forms on trunk and branches respectively. These are described. The prescribed treatment is spraying with 3% ferrous sulphate or 3-5% bordeaux solution in winter and with normal concentrations during wet periods of the growing season. Casual wounds must be disinfected. Infected shoots should be cut back right into the healthy wood.

### *Passion fruit.*

(See also 845.)

923. ANON.

**Woodiness or mosaic disease of passion fruit.**

*Agric. Gaz. N.S.W.*, 1951, 62: 305-6, illus.

The passion fruit mosaic virus attacks vegetables, ornamentals and weeds of a number of botanical families. The most characteristic symptom on the passion vine is undersized, misshapen fruit with thickened, woody rind and reduced pulp cavity. Control measures aim at masking symptoms by providing favourable growth conditions. A warm site should be selected for the plantation. The vines should be transplanted early in the summer. Areas to be replanted in the following summer should be put under a green crop during the late autumn and winter, and relatively heavy dressings of fertilizer should be given in the spring and summer.

### *Tung.*

(See also 23, 1109.)

924. NEFF, M. S., AND O'ROURKE, E. N., Jr.

**Factors affecting the initiation of new roots in newly transplanted tung trees.**

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 186-90, bibl. 1.

One-year-old tung seedlings were planted in sand [at Cairo, Georgia] on 2 March and, after being subjected to various treatments, were lifted on 20 April, 20 May or 15 June for examination of root systems. The treatments were (1) control—cut back to 7 in. at planting, (2) control plus hormone ("Rootone") treatment, (3) removal of all buds till 25 May, (4) removal of buds plus hormone treatment, (5) ringbarked just below ground level, and (6) whole trunk removed below ground level. Total weight of roots, weight of fibrous roots, weight of callus roots and top growth weight were recorded. The results showed that when a top was not allowed to develop, either by removal of the trunk or buds, new root production was very small. Ringing also reduced root growth, but top growth was reduced to a lesser extent. The hormone treatment with "Rootone" had its greatest effect on the callus roots, the weight of which was doubled by "Rootone" application. Soaking in 20 p.p.m. indolebutyric acid for 29 hours also produced more root growth. Very

little root growth was made until top growth started in May.  
C.W.S.H.

925. BAKER, C. M., AND ANDREWS, W. B.  
Anhydrous ammonia machine developed for  
tung orchards.  
*Inf. Sheet Miss. agric. Exp. Stat.* 449,  
1950, pp. 2, illus.

The difficulty with machines previously recommended has been that the chemical quickly evaporates because it does not come into contact with enough soil to ensure absorption. In the machine described here a disc coupler is used to cut through the trash. Four field-cultivator springs are used to trip the applicator. Wings are welded on the bottom of the applicator to increase the ammonia absorbing volume of soil. The depth at which the applicators are run is controlled by a gauge-pack wheel which also packs the soil behind the applicator.

### Noted.

926.

a ANON.

Citrus products in Jamaica.  
*Food*, 1951, 20: 336-40, illus.

A new citrus processing factory designed primarily to produce concentrated orange juice is described.

- b HODGSON, R. W., SCHROEDER, C. A., AND WRIGHT, A. H.

On the comparative resistance of the avocado and certain other tender sub-tropicals and tropicals to low winter temperatures.

*Yearb. Calif. Avocado Soc. for 1950*, pp. 32-44, bibl. 7.

For a more complete version, see *Proc. Amer. Soc. hort. Sci.*, 56: 49; *H.A.*, 21: 2889.

- c MARTIN, H., AND ALIBERT, H.

Observations sur *Ceratitis capitata* Wied. en Algérie et résultats obtenus sur agrumes dans la lutte contre cet insecte. (Observations on *Ceratitis capitata* Wied. in Algeria and the results of control trials in citrus.)

*C.R. Acad. Agric. Fr.*, 1951, 37: 129-31.  
Good control was obtained with DDT 50% at 0.5%.

- d VERNEAU, R.

Forti danni da *Phytophthora syringae* Leonian nei limonetti della Costiera Amalfitana. (Heavy damage from *Phytophthora syringae* Leonian in lemon orchards of the Amalfi coast.)

*Not. Mal. Piante*, 1951, No. 15, p. 1.

Losses of 80% to 100% of the crops are recorded.

## TROPICAL FRUIT AND PLANTATION CROPS.

### General.

(See also 12, 17, 403, 1057, 1067, 1076, 1084, 1091, 1098, 1101, 1102, 1103, 1105, 1106, 1114, 1117.)

927. SUMMERVILLE, W. A. T.

Contributions of agricultural research in crops.—3. Tropical horticulture.

*J. Aust. Inst. agric. Sci.*, 1951, 17: 80-2.

**Bananas:** Early work consisted of variety testing and showed the Cavendish banana to be most suited to Australian conditions. Mons Mare is also an important commercial variety. Destruction of the crop by bunchy top disease was saved by an eradication campaign. Control measures for "squinter disease" have been enforced by legislation. Much work has been done on transport and storage. **Pineapples:** Wilt disease nearly wiped out the Queensland pineapple industry in the late 1920s. Cultural methods of control have, however, been so successful that the pineapple is now the foremost commercial fruit. Fruits being transported suffer from water blister disease (*Ceratostomella paradoxa*), but this disease can now be controlled. Soil studies have been used in detecting areas suitable for pineapples. Acid soils are required. The effect of hormones on the induction of flowering has been studied. **Papaws:** Scientific work has been confined to the last 15 years. Introductions from abroad have been made and local selection has been carried out. The part played by *Gloeosporium* and *Colletotrichum* in fruit infection has been studied.  
C.W.S.H.

928. SERRUYS, R. B.

L'économie agricole du Congo belge. (The agricultural economy of the Belgian Congo.)  
*Bull. bimestr. Soc. belge Ét. Expans.*, 1950, 49: 766-71, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 42.

Deals with production, prices and export of wood, cacao, coffee, rubber, cotton, fibres, palm oil and palm kernels.

929. ANON.

Le Congo belge veille à la qualité de ses produits en les contrôlant. (The Belgian Congo safeguards the quality of her products.)

*Congopresse*, 1950, 78: 1582-3, Dutch text pp. 1591-2, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 70.

An account of the inspection system in the Belgian Congo for controlling the quality of export products, including rubber, bananas, fibres, raffia, coffee, cinchona bark and pyrethrum flowers and dusts.

930. COYNER, M. S.

Cuban trade in principal agricultural products.

*Statist. Bull. U.S. Dep. Agric. Office for agric. Relat.* 96, 1951, pp. 33, 15 cents.

Exports and imports including a large number of horticultural products.



931. MUNSELL, H. E., AND OTHERS.

Composition of food plants of Central America. I. Honduras; II and III. Guatemala; IV. El Salvador; V. Nicaragua; VI. Costa Rica; VII. Honduras; and VIII. Guatemala.

*Food Res.*, 1949-50, 14: 144-64; 15: 16-33, 34-52, 263-96, 355-65, 379-404, 421-38, 439-53, bibls., from abstr. in *Field Crop Abstr.*, 1951, Vol. 4, abstr. 571.

A report of an investigation carried out by the Nutritional Biochemistry Laboratories, Massachusetts, on the nutritive value of the edible plants of Central America.

932. PARDY, A. A.

Notes on indigenous trees and shrubs of Southern Rhodesia.

*Rhod. agric. J.*, 1951, 48: 261-6, illus.

This is the first of a series of notes to be published on the common indigenous trees and shrubs of Rhodesian woodlands. In a short introductory section a classification of these woodlands is given: the two main divisions are closed forest and open forest or tree veldt. The latter is subdivided according to the dominant type species. Two such species—*Parinari mobola*, the Grysappel or Muchacha, and *Uapaca kirkiana*, the wild loquat or mahobohobo—are described in detail in this first article. C.W.S.H.

933. VINK, A. P. A.

Mechanisatie in de bergcultures. (Mechanization of highland plantation crops.)

*Bergcultures*, 1950, 19: 169-71, and 1951, 20: 125-31, illus.

The first part deals briefly with some general problems of mechanization, the second with the possibilities of mechanization for (a) clearing and reclaiming land and controllingalang grass, (b) cultivation and weed control before and after planting, (c) land improvement, (d) disease control, and (e) harvesting and transport.

934. VINK, A. P. A.

Hydrologie en bodembescherming op de bergcultuur-ondernemingen in Indonesië. (Hydrology and soil conservation on the highland estates of Indonesia.) [English summary ½ p.]

*Bergcultures*, 1951, 20: 277-87, bibl. 12, illus.

The damage that has been caused by erosion, due to the shifting cultivation practised during the war on the non-irrigable highlands of Indonesia, is discussed. Some results of analyses are given to demonstrate the importance of the top layer of soil and of some soil conservation practices. Other problems dealt with are the water shortage caused on some estates by illegal deforestation, the introduction of mechanical cultivation, and the thinning of shade trees on tea estates for the prevention of blister blight.

935. FUJIMOTO, G., AND SHERMAN, G. D.

Molybdenum content of typical soils and plants of the Hawaiian islands.

*Agron. J.*, 1951, 43: 424-9, bibl. 16, being *Tech. Pap. Hawaii agric. Exp. Stat.* 210.

Molybdenum contents are tabulated for a large

number of soils and plants, the latter including sugar cane leaves, Japanese tea, guava leaves, celery, cabbage and lettuce. A much lower molybdenum content, from 0 to 2.50 p.p.m., was found in plants in Hawaii than that reported from other areas.

936. VAN WUK, C. L.

Soil survey of the tidal swamps of south Borneo in connection with the agricultural possibilities. [Indonesian summary 2½ pp.]

*Contr. gen. agric. Res. Stat. Bogor* 123, 1951, pp. 49, bibl. 29, illus., maps.

Apart from swamp rice cultivation, for which there are considered to be good prospects in the area surveyed, these drained areas offer possibilities for the cultivation of secondary crops, including *Citrullus*, sweet potatoes, and the laticiferous tree *Dyera lowii*. The small dykes separating the paddy fields are suitable for the cultivation of fruit trees, pineapples, sugar cane and various vegetables. Rubber has been grown in well-drained localities in the tidal region for many years, although rubber production is relatively low. The oil palm also appears to offer good prospects on the well-drained and thinner peat layers. Coconut palms, however, usually develop yellow crowns, probably a symptom of nutrient deficiency.

937. VAN DER GOOT, P.

Over levenswijze en bestrijding van sawah-ratten in het laagland van Java. (Biology and control of the rice field rats in the lowlands of Java.) [English and Indonesian summaries pp. 9 and 10 respectively.]

*Landbouw*, 1951, 23: 123-294, bibl. 78.

This extensive investigation was carried out from the Institute of Plant Diseases, Bogor, during the period 1932-43. Although rice is the principal crop concerned, and is, moreover, the "food par excellence" of the rats, secondary crops such as sweet potatoes grown during the east monsoon are also attacked. From June to September serious damage is also caused to young sugar cane plantations by rats from harvested paddy fields. Control by direct methods (poison baits, poison gases and opening up the holes) and by indirect methods (cultivation practices) is discussed.

## Bananas.

(See also 927, 929, 1046d, 1079.)

938. ROY, R. S.

Cultivation of banana in Bihar.

*Indian Fmg*, 1950, 11: 179-82, illus.

The dessert and cooking varieties in Bihar are listed. Methods and costs of planting and cultivation are described. Manuring is carried out in February and July and a mixture of farmyard manure, compost, ashes and castor cake is recommended. It is considered that the banana crop should be rotated with field crops and should only remain in one field for 3 years at a time. A root rot and a stem borer are respectively the most serious disease and pest of bananas in Bihar. C.W.S.H.

939. WILLS, J. M.

Banana growing in Queensland.

*Qd agric. J.*, 1951, 72: 147-58, 223-36, illus.

*Musa cavendishii* is the most extensively grown variety in Queensland. Two mutants, the semi-dwarf Mons

Mare and the Williams' Hybrid, are also grown and produce superior bunches. Of the tall varieties, Lady Finger and Sugar are grown to some extent on frost-free river flats and on higher lands. Water-retentive, but freely-draining, soils are chosen in areas of 50-100 in. rainfall. Open forest soils are less fertile than rain forest soils. Alluvial soils vary greatly: the lighter ones require irrigation and the heavier ones need careful drainage. In southern Queensland the choice of variety depends largely on altitude. Contouring is necessary on most sloping lands and details are given of a simple rapid method, using an "A" frame. Propagation is by suckers or sections of the mature corm with a prominent eye. Planting distances vary from 9 ft. x 9 ft. to 16 ft. x 16 ft. according to variety. Fertilizers are commonly used, an 8:10:8 formula being suitable for most soils at the rate of 10 cwt. per acre for first crop and 20 cwt. for later crops. Cover cropping is limited to districts with heavy rainfall as in dry districts covers may compete for available moisture. Cowpeas, grown across the slope, are suitable. The use of pigeon peas for reconditioning old banana land is preferable to the development of a natural cover of lantana. The pigeon peas can be brushed to the ground and used as a mulch before replanting bananas. Arsenic pentoxide and sodium arsenite are used as weedicides. 2,4-D has damaged bananas through wind drift. Choice of suitable suckers and desuckering are now given careful attention. The paper ends with a discussion of harvesting, marketing, artificial ripening and legislative control of disease. C.W.S.H.

940. ROBAYO MESA, V.

Posibilidades para el cultivo comercial del banano en la costa del Pacifico. (The possibilities of banana growing on a commercial scale on the Pacific coast [of Colombia].)

*Agric. trop. Bogotá*, 1950, 6: 9: 12-14.

The soil and climate of the Pacific coast of Colombia are very favourable for the development of a banana industry, but success will depend on several other factors, discussed here. These include financial backing by the government, the construction of roads, the development of a plant protection service, the availability of labour and the formation of co-operatives.

941. REINKING, O. A.

Banana mosaic in Borneo and its relationship to abacá mosaic in the Philippines.

*Plant Dis. Repr.*, 1951, 35: 31-2, bibl. 9.

Typical banana mosaic has been observed on plants of the Lady Finger and Cavendish varieties at Tawau, British North Borneo. Because of this and the presence of a virus-infected weed suspected of carrying abacá mosaic in the Philippines, and the presence of mosaic virus aphid carriers, a careful watch should be maintained for abacá mosaic appearance in Borneo.—U.S. Dep. Agric.

942. PLAZAS M., G.

Una afección de la *Musa paradisiaca* y otras musáceas. (A disease of *Musa paradisiaca* and other Musaceae.)

*Acta agron. Palmira*, 1951, 1: 133-67, bibl. 45, illus.

A study is reported of a disorder of plantains observed

in the departments of Caldas and Valle del Cauca, Colombia. Infected plants are dwarfed, the leaves are pale green with desiccated edges and the root systems are poor. A detailed description is given of the external and internal symptoms of the disease, which varied somewhat with soil conditions. The same symptoms have been reported on *M. paradisiaca sapientum* and *Heliconia* spp. Negative results were obtained with laboratory and field inoculations of fungi and bacteria. The roots were found to be infested with the nematode *Heterodera marioni* which is considered responsible for the trouble. The literature on the biology of the nematode is reviewed and its dissemination and control in the field are discussed. Control measures recommended include rotation of crops, application of organic matter and lime to the soil and care in propagation. Investigations on the possibilities of chemical control and the selection of resistant varieties are needed.

Cacao.

(See also 928, 1046c, h, s.)

943. MUELLER, W.

Bibliographie des Kakao—seiner Geschichte, Kultur, Verwendung, Verarbeitung, wirtschaftlichen Bedeutung. (Bibliography of cacao—its history, cultivation, use, manufacture and economic importance.)

*Publ. Gordian*—Max Rieck, Hamburg, Germany, 1951, pp. 120, D.M. 8.60.

This bibliography, compiled and used for the preparation of a work on "History of cocoa and chocolate"—pending publication—is divided into two parts. The first part [pp. 7-46] comprises unnumbered literature up to the year 1900 and that of purely historical interest. The second part [pp. 47-112], covering the past 50 years, includes 2,700 references to publications and is provided with a multilingual, but rather inconsistent, subject index. While the recent U.S. [Miss Watrous's] bibliography [see *H.A.*, 21: 3973] is of interest chiefly to primary producers and research workers connected with cacao production up to and including the processing of beans in the country of origin, this work covers everything, from the soil requirement of the cacao plant to the effect of chocolate on the teeth.

944. F.A.O., WASHINGTON.

Cocoa.

*Commodity Rep. F.A.O.*, 1951, pp. 30, 25 cents.

In this second report on cocoa, information available up to mid-February 1951 is presented and discussed on production, trade and consumption, and international marketing. About half the report is devoted to statistical tables on exports, imports, stocks, and prices. In the section on production, trends and prospects in each of the Latin-American countries are considered briefly. World production may be expected, given favourable weather, to increase slowly over the next few years.

945. URQUHART, D. H., AND DWYER, R. E. P.

Prospects of extending the growing of cacao in Papua and New Guinea.

*Publ. Cadbury Bros. Ltd., Bournville*, 1951, pp. 39, illus., 5s.

This report is divided into two sections. In the first section the first author described the present position of the cacao industry in Papua/New Guinea. Cacao has been successfully interplanted with coconuts and there is no evidence that copra yields have been reduced by its presence. The cacao itself has also given a satisfactory yield. It is considered that large areas in New Britain, Bougainville and the Mainland are suitable for cacao. A scarcity of labour is likely to be a limiting factor in some districts, but the adoption of a measure of mechanization is expected to be of assistance. Training on estates can assist in the establishment of native holdings. Local hybrids which tend towards the Forastero type are considered most suitable, and their multiplication by cuttings is advocated until the production of true-to-type breeding seed has been evolved. The second author deals with the economics of cacao production. It is estimated that 200,000 acres could satisfy Australasian requirements, and there would be little difficulty in finding this acreage. Methods and costs of planting are discussed in detail, and a special section is devoted to estimating the cost and gross returns of a mixed coconut and cacao property comprising 250 acres of cacao and 500 acres of coconuts. The report has appendices on Cacao at Keravat Experimental Station by F. C. Henderson, the Geology and soils of Bougainville and Buka by R. E. P. Dwyer, Soils of Collingwood Bay by G. Graham, together with extracts from the *New Guinea Agricultural Gazette*, giving meteorological data and information on the soil of other potential areas. C.W.S.H.

946. URQUHART, D. H.

Prospects of the growing of cacao in the British Solomon Islands, with notes on Malaya, Ceylon and Java.  
*Publ. Cadbury Bros. Ltd., Bournville, 1951, pp. 44, illus., 5s.*

Coconuts are established on the shallow, coastal soils overlying coral. Though these soils are not suitable for cacao, there are considerable areas of alluvial and other soils which are. It is recommended that planting material be introduced mainly from Keravat in New Britain, and that first plantings be from seedlings raised in nursery baskets. Small plantations would be established near the main, potentially important, centres, and it is considered that shades such as *Crotalaria anagyroides*, *Leucaena glauca* and crop plants such as *Colocasia* sp. and bananas should be used. Appended to the report are estimates of costs of a scheme for introducing cacao, notes on Solomon Island soils, and meteorological data. Included in this report are accounts of visits to recently established cacao areas in Malaya, and to the older areas of Ceylon and Java. In Malaya it was noted that exceptionally good growth was being made by cacao growing in rentices [or rides] in high forest. In some areas there appeared to be insufficient shade. A 1,200-acre estate is being established in Trengganu. The author considers that the prospects of growing cacao in Malaya are good. In Ceylon successful mixed plantings of rubber and cacao were seen, though this combination has failed elsewhere. The cacao provides shade in rubber estates, where the rubber bark is inclined to dry up and make tapping difficult. In Java there are three main selections, DR 1 and DR 2,

which are intermediate between Forastero and Criollo cacao, and DR 38 which is a Criollo type. Propagation by budding is preferred to the rooting of cuttings. C.W.S.H.

947. ANON.

Malaya; proefnemingen met cacao-aanplant. (Cacao trials in Malaya.)  
*Econ. Voorlichting, 1951, 45: 13: 28, from abstr. in DocumBl. trop. Prod. Amst., 1951, 6: 273.*

After 2 years trials have shown that production of cacao per tree is too low in Malaya. The trials are continuing, however, and it is thought that within 10 years cacao will be exported.

948. DE ROJAS-PÉÑA, E.

Los cacaotales del río Guaviare. (The cacao of the river Guaviare valley.)  
*Agric. trop. Bogotá, 1951, 7: 1: 27-32, and 2: 49-56, bibl. 8, illus.*

The geography and ecology of the uncultivated cacao zones of eastern Colombia are described. More than 600,000 cacao trees grow in the Guaviare valley, of which only half are economically exploitable. The trees appear to be indigenous and are all of the species *Theobroma leicocarpum*, probably variety *Maranhao liso*. Witches' broom disease, which is prevalent in neighbouring districts, is unknown there. The only disease found was black rot of the pods (*Phytophthora faberi*), which was not causing serious damage. It is recommended that this variety, because of its purity, hardness and resistance to disease, should be included in the breeding programmes of the research stations. Suggestions are made for the exploitation of the trees.

949. DODDS, K. S., AND COPE, F. W.

Field experiments with clonal cacao.  
*J. hort. Sci., 1951, 26: 249-60, bibl. 7.*

Analyses of yield records of wet cacao are presented for 3 sets of clonal trials with CRB1, 2, and 3 for five, six and five crop seasons respectively. Cuttings have consistently out-yielded buddings, the superiority being most marked in seven good clones. Pen manure, augmented by artificial fertilizers, and cut bush, similarly augmented, applied to CRB1 and CRB3 clones respectively, in the sixth crop season, have given significant and favourable responses.—Imperial College of Tropical Agriculture, Trinidad.

950. PEARCE, S. C., AND THOM, J. M. S.

A study of plot-size with Nigerian estate cacao.  
*J. hort. Sci., 1951, 26: 261-7, bibl. 8.*

Optimum plot-size for experiments on Nigerian estate cacao was investigated for two fields at Agodi, the data representing numbers of pods in two-year periods. If economy in land is important, plots should be as small as practicable and corrections by covariance should be made upon crops of the preceding two or four years to reduce error. In this way, if plots are not more than 0.025 acre in area, about 0.15 acre per treatment is needed for a reasonably accurate experiment. [Authors' summary].—East Malling Research Station.

951. MACLEAN, J. A. R., AND WICKENS, R.

Application of an incomplete block design to the assessment of quality in cacao.  
*Nature, 1951, 168: 434-5, bibl. 4.*



It is shown that the incomplete block lay-out may be applied "to the design of a laboratory assessment panel where a large number of samples have to be submitted to subjective tests". The tasters found that the chocolate flavour of liquors prepared by a standard procedure (Cocoa Panel) from cacao beans was not affected by fermentation, and that the quality of the T 60 type is markedly inferior to that of other types of cacao.—West African Cacao Res. Inst., Tafo.

952. ANON.

**Hormones increase productivity of cacao trees.**

*Foreign Crops and Markets*, 1951, **62**: 4: 87, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, **6**: 206.

It is thought that the productivity of cacao trees could be increased by a technique developed in Colombia which involves the use of hormones to rejuvenate the weak flower cushions on the lower part of the trees.

953. CIFERRI, R.

**Hollow heart of cacao beans.**

*Phytopathology*, 1951, **41**: 656, bibl. 1.

A malformation of fresh Criollo cacao beans in Venezuela is characterized by a blackish-brown discoloration of the central portion of the seed which appears as a small lenticular cavity completely enclosed by the surrounding healthy, pale pink or white flesh of the cotyledons. Hollow heart is found only in beans of Criollo subspecies or in high quality hybrids. It is found in only a very small percentage of beans, rarely reaching 10% to 15% or from 1 to 5 seeds per pod. The cause is unknown, but it is suggested that it may be a result of nutritional deficiency such as is often found in cacao estates in the sandy valleys of the Caribbean coasts.

954. STRICKLAND, A. H.

**The entomology of swollen shoot of cacao.**

**II. The bionomics and ecology of the species involved.\***

*Bull. ent. Res.*, 1951, **42**: 65-103, bibl. 20.

A method for the routine quantitative estimation of mealybug populations on cacao trees is described and the results obtained from 24 successive monthly samples are tabulated. The quantitative results obtained are of such variability that only gross differences in population density are shown as statistically significant. From a series of analyses based on the survey data the following conclusions have been reached with regard to *P. njalensis*, the most important mealybug vector of swollen shoot virus: (a) The species is almost invariably attended in the field by *Crematogaster* ants, the most important ant species building protective carton tents over the mealybug colonies. (b) *Crematogaster* density is closely correlated with mealybug density. (c) Tree to tree variation in mealybug density is shown to be largely dependent on the identity of the dominant ant group. (d) No direct correlation is apparent between mealybug density and incidence of swollen shoot, though populations in areas devastated by virus are usually smaller than in areas in which virus is actively spreading. (e) Since the protected density of *P. njalensis* is a direct result of ant associations it follows that factors tending to control the attendant ant species will have a delayed

effect on mealybug density. In this respect it is believed that *Oecophylla*, which is strongly negatively correlated with *Crematogaster* spp., is of importance. Any attempts that may in the future be made to control the mealybugs by killing the ants will have to be designed as specific against the *Crematogaster* and non-lethal to *Oecophylla* and the other large predatory ants common on cacao. [From author's summary].—West African Cacao Res. Inst., Tafo.

955. HOLLIDAY, P.

**The control of witches' broom disease of cacao.**

*Proc. agric. Soc. Trin. Tob.*, 1950, **50**: 393-9.

Control measures discussed include cutting out brooms and diseased cushions and pods in April and October, the establishment of new areas of cacao in isolated blocks with guard zones of other crops around them, and the use of the less susceptible clones. Low susceptibility has been shown by ICS 1, 6, 44, 45, 95 and 98, ICS 95 being the least susceptible to pod infection of any of the Trinidad clones. ICS 8, 16, 53 and 60 have proved highly susceptible. Attempts to infect the Amazon clones SCA 6 and SCA 12 have so far been unsuccessful but yield data on these clones have not yet been obtained.

956. PALMA, M. [Translation CLARKE, W. T.].

**The processing of fresh cacao seeds.**

Translation of an Official Venezuelan Bulletin obtainable from Rockwood & Co., Cocoa-Chocolate, Brooklyn 5, N. York, 1951, pp. 33, bibl. 12, illus.

This bulletin, excellently equipped with illustrations and diagrams, describes clearly for the cacao producer (1) the well recognized processes of fermentation which take place in the fresh seed, (2) the methods of bringing these processes about and (3) the most practical methods of obtaining first-class quality in his product.

**Cinchona.**

957. RIVALS, P.

**La question du quinquina à la Réunion.**

**(Cinchona in Réunion.)**

*Rev. agric. Réunion*, 1950, **50**: 141-8, 207-15, 255-70; 1951, **51**: 5-22, bibl. 15.

A historical account is given of the several unsuccessful attempts made during the last 85 years to introduce cinchona cultivation into Réunion. Results of various analyses, moreover, which are here tabulated, show that the total alkaloid and quinine contents of trees on Réunion were low. The failures are shown to be due mainly to the choice of unsuitable sites as regards soil, climate and accessibility, and to poor cultural practices. It is concluded that future plantations should be made at altitudes below 1,000 m. on fertile, permeable soil in districts with adequate, regular rainfall and temperate climatic conditions. Certain parts of the Sainte-Rose district fulfil these requirements.

958. ANON.

**Brazililë; kinacultuur. (Cinchona culture in Brazil.)**

*Econ. Voorlichting*, 1951, **45**: 11-20, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, **6**: 276.

\* For Part I, see H.A., 21: 3981.

A region in São Paulo at an altitude of 900-1,100 m. and bordering on Minas Geraes is considered suitable for the cultivation of cinchona. Good results have been obtained at Joanópolis.

959. WINCKEL, C. W. F.  
De kinacultuur in Indonesië. (Cinchona cultivation in Indonesia.)

*Med. Maandbl.*, 1950, 3: 443-51, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 248.

A historical review with notes on the extraction and importance of quinine.

960. WINTERS, H. F.  
Cinchona propagation.

*Bull. P.R. agric. Exp. Stat. Rio Piedras* 47, 1950, pp. 26, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 26.

Raising of planting material, preparation of seedbeds, grafting and pests and diseases are dealt with.

961. LOUSTALOT, A. J., PAGÁN, C., AND WINTERS, H. F.

The effect of age and height on the total alkaloid and quinine content of cinchona trees.

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 207-10, bibl. 3.

In trials at Mayaguez, Puerto Rico, the percentage of total alkaloids and of quinine in different parts of 3- to 6-year-old cinchona trees did not show consistent variations with age. With trees of different sizes, however, there was a tendency for taller trees to have a higher alkaloid and quinine percentage, though this tendency was not very pronounced. C.W.S.H.

962. SZKOLNIK, M.  
Phytophthora parasitica diseases of cinchona in central American field plantings.

*Plant Dis. Rept.*, 1951, 35: 16-24, bibl. 8, illus.

*Phytophthora parasitica* causes two dissimilar phases of disease to cinchona trees in field plantings, "top blight" of sprouts and branches, and "girdle canker", a trunk disease. Spread of the disease is favoured by cool, wet, humid weather, dense stands, poor exposure, and other conditions which prevent adequate drying of plantings. *Cinchona ledgeriana* and related hybrid clones are very susceptible; *C. succirubra* and related hybrid clones show considerable tolerance to most strains of the pathogen. The fungus is soil-borne and many infections result from the splashing of contaminated soil onto sprouts and trunks by rain.—Experimental Plantations Inc., Guatemala.

963. DARLEY, E. F., AND FLORES, M. A.  
Two cankers of cinchona in Guatemala caused by *Phytophthora cinnamomi* and *P. parasitica*.

*Phytopathology*, 1951, 41: 641-7, bibl. 11, illus.

Stripe canker and girdle canker, two distinct bark diseases of cinchona, hitherto undescribed in the Western Hemisphere, have caused serious losses in some plantations in Guatemala; they are caused by *Phytophthora cinnamomi* and *P. parasitica* respectively. *P. cinnamomi* is soil-borne and attacks all the clones tested; only one clone, Z-15, appeared to show any

resistance. The girdle-canker fungus apparently enters the host through small succulent shoots near the base of the tree. Many of the clones inoculated were highly resistant to this disease.—Instituto Agropecuario Nacional, Guatemala City.

### Cloves.

964. NUTMAN, F. J., AND OTHERS.  
The Sudden-Death disease of cloves and its economic and agricultural significance.

*Emp. J. exp. Agric.*, 1951, 19: 145-59, bibl. 6.

The authors show how owing to lapse of time between recommendations and action it appeared inexpedient to implement the recommendations of the Keen-Nutman memorandum for the control of Sudden-Death of cloves on the islands of Pemba and Zanzibar. They review the history of the scheme and discuss the data acquired in preparation for it. Partial surveys made in 1948 and 1949-50 estimate the separate outbreaks in Pemba as more than 2,000, averaging 25 dead trees each. The present annual rate of increase in number of outbreaks would be about 14%. An attempt is made to forecast the probable future development of the disease. Suggestions are made for rehabilitation in Zanzibar Island, where up to the present the inroads have been much more severe than in Pemba. They are based on elimination of residual sources of disease in devastated areas and planned replanting with cloves and other crops, of which there are already a large number known to flourish under local conditions. Thus coconuts, cacao, citrus, kapok and all tropical fruits do well. Liberica coffee has a ready market. Derris and pineapple offer possibilities, as also possibly chillies and peppers. Essential oils such as lime and ylang-ylang and the candle nut, source of lumbang oil, are already at hand growing well.

965. BOLT, O. F.  
Cultuuraanwijzingen voor kruidnagel (*Eugenia aromatica* O.K.). (Culture of cloves.)

*Meded. Prakt. Landb. Proefstat. Bogor*, 1950, 15: 1-16, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 79.

A short review of the history and economic importance of the clove plant is followed by graphs of the rainfall in the production areas, Zanzibar, Ambon and Minahassa, and notes on the botany, varieties, culture, yields, pests and diseases of the clove.

### Coconuts.

(See also 928, 929.)

966. NIRULA, K. K., ANTONY, J., AND MENON, K. P. V.  
Investigations on the pests of the coconut palm. (1) The rhinoceros beetle (*Oryctes rhinoceros*). Control of grubs of *Oryctes rhinoceros*.

*Indian Coconut J.*, 1950, 4: 5-12, 34-5, bibl. 14.

*Oryctes rhinoceros* breeds in manure heaps and heaps of rotting vegetation. Experiments were carried out to test the effect of spraying or dusting DDT and BHC (containing 13% or 7% of the gamma isomer) onto

these heaps. DDT was slow in its effect and gave time for the grubs to crawl out and find other breeding places. BHC, with both 13% and 7% gamma isomer, and applied as 0.1% dusts or sprays, was very effective, most of the grubs being killed or paralysed within 24 hours. Spraying was preferred to dusting, as water suspensions penetrated better into the manure heaps. Both DDT and BHC had residual effects up to 2-3 months. C.W.S.H.

967. WAY, M. J.

An insect pest of coconuts and its relationship to certain ant species.

*Nature*, 1951, 168: 302, bibl. 8.

Widespread damage of coconut fruits in Zanzibar was shown to be caused by a coreid bug, identified as *Theraptus* sp. In the course of studies on the tree-nesting ant *Oecophylla longinoda* in connexion with clove diseases, the ant was observed destroying *Theraptus* sp. nymphs on coconut palms, and it probably destroys or deters the adults. Certain ground nesting but tree foraging ants, notably *Anoplolepis longipes* and *Pheidole megacephala*, ssp. *punctulata*, which have replaced *O. longinoda* in many coconut areas, were not found aggressive towards *Theraptus* sp.

968. LEFORT, M.

Le marché du copra en Indonésie. (Copra production in Indonesia.)

*Rev. int. Prod. colon.*, 1950, 25: 195, 197-9, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 25.

A survey of the culture, preparation and marketing of copra in Indonesia. Production and export figures are given.

*Coffee.*

(See also 58, 10460, t, u, w, x, y.)

969. ANON.

Fertile land in Para awaits coffee planters. *Tea Coffee Trade J.*, 1950, 99: 6: 66, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 112.

The possibility of establishing coffee in the Tocantins Valley, Para, Brazil, is discussed, and the costs are calculated.

970. RAMANATHAN, V., BAL, D. V., AND THOMAS, K. M.

A review of past experimental work on coffee in South India with suggestions for the future.

[*Publ.*] *Indian Coffee Bd Res. Dep.*, 1951, pp. 56+11, bibls. 22 and 9.

This review opens with a summary of the main points gleaned from bulletins and reports dealing with acreages and production in India and yields and the results of research in India and other countries. The chief coffee growing areas in S. India are divided into 11 zones and tabulated notes are provided on the following features in each: elevation, rainfall (quantity and period), nature of soil, %  $P_2O_5$ , N and  $K_2O$ , and remarks on type of coffee grown and incidence of diseases and pests. Manurial experiments involving NPK in various forms, combinations and quantities

were started at Balehonnur in 1925-26, and the results of each of these trials and of subsidiary trials carried out on estates are summarized and discussed briefly. More recent trials that have not yet been completed include experiments with catalysts such as ferrous sulphate and potassium permanganate, trials with weed-killers and cultivation experiments. Work on coffee breeding was started in 1927. Details are given of the yields of a large number of single plant selections of arabica and robusta and of 4 promising inter-varietal arabica crosses. Inter-specific crosses made are listed, but it is too early to say if any will be of value. Brief notes are supplied on the Devamachi hybrids (robusta type) and on the collection of species and varieties assembled for study. The success attained in the propagation of plants from double noded, softwood cuttings is described and the results of experiments with growth promoting substances are tabulated. Grafting has also been used successfully and the yields of grafted plants are compared with those of seedlings from the same parents. The results of pruning and miscellaneous experiments are mentioned. Suggestions for future experiments relate to soils, manures, breeding, selection and vegetative propagation. An appendix prepared by the third author describes the results of spraying experiments on the control of rust (*Hemileia vastatrix*), and the indirect tonic effects of copper sprays. Future work on the control of rust, black-rot (*Pellicularia koleraga*), die-back and root rot is discussed. Insect pests that have received some attention are the white stem borer *Xylotrechus quadripes*, the shot hole borer, the green bug *Lecanium viride*, and the mealybug *Pseudococcus citri*.

971. VÁZQUEZ CALCERRADA, P. B.

Relaciones de los socios en una cooperativa de venta de café. (Member relationships in a co-operative coffee marketing association.)

[English summary and conclusions pp. 5.]

*Bol. Estac. exp. agric. Río Piedras* 90, 1951, pp. 53, bibl. 19.

A study is reported of the relationship of the members of the co-operative coffee marketing association "Cafeteros de Puerto Rico" to the association, and of the effect of such factors as age, education and size of farm of the member on his understanding of the principles of co-operation and on his participation in the work of the association. Methods of improving co-operation by such means as education and extending the scope of the association are discussed.

972. MORALES, J. O., KEEPPER, W. E., AND GOMEZ Q., F.

Estudio económico de fincas cafeteras. (An economic study of coffee estates.)

*Agric. trop. Bogotá*, 1951, 7: 3: 33-8.

This study was undertaken by the Interamerican Institute of Agricultural Sciences and the National Federation of Coffeegrowers, Colombia, in 1948 to investigate the causes of variation in costs of production on different coffee estates. The results published here are only preliminary and are based on results obtained on 15 estates in Colombia and 5 in Costa Rica. Tables are given analysing the costs of production and indicating the relationship between efficiency in management, yields and costs of production.



## 973. GARDNER, V. R.

Variaciones de rendimiento en una plantación de café procedente de semillas. (Yield variations in a seedling coffee plantation.) *Agric. trop. Bogotá*, 1950, 6: 9: 7-11.

The yield variation over a period of 5 years is tabulated for 810 seedling coffee trees, mostly *Coffea arabica*, grown at the Experimental Station of the Coffee Growers' Federation, Chinchiná, Colombia. Variation in yield was to a certain extent associated with variation in size of tree, caused by soil variation. Even among trees of the same size, however, outstanding differences in yield were apparent, and it is estimated that the average crop could be more than doubled by the use of high-yielding clones.

## 974. RAMIREZ BERMUDEZ, J.

El Instituto Agronómico de Campinas y la fitotecnica aplicada en el mejoramiento del café. (The Campinas Institute of Agronomy and the methods used in coffee breeding.) *Publ. Minist. Agric. Guatemala*, 1951, pp. 133, bibl. 50, illus.

The main body of this thesis report deals in considerable detail with the work that has been carried out since 1932 by the Genetics Subsection of the Campinas Institute of Agronomy, Brazil, on the breeding of improved forms of coffee. An account is given of the techniques and materials used and of some of the results obtained. In an introductory section the distinguishing characters of coffee production in Brazil are summarized, and there are two appendices dealing respectively with the scope of the work of the other sections of the Institute and with the results of investigations on the coffee berry borer carried out by this Institute and the Biological Institute, São Paulo.

## 975. KRUG, C. A., AND OTHERS.

Uma nova forma de *Coffea*. (A new form of *Coffea*.) [English summary  $\frac{3}{4}$  p.] *Bragantia*, 1950, 10: 11-25, bibl. 12, illus.

In 1935 a new type of coffee was found by chance on an estate in Viradouro County, Brazil, which combines the character of vigour with that of good "cup quality", a combination that has long been the aim of the breeding programmes of the Instituto Agronómico, Campinas. The characters of the new type, known as No. 387, are here described. It is thought to be a natural hybrid between *C. arabica* and *C. dewevrei*. It has 44 chromosomes, is very vigorous and productive, and of reasonably good quality, but is almost completely self-sterile. A study of its genetical constitution is reported. No. 387 is considered to be especially valuable for use in breeding work. It is also being grown in experimental plots with *C. arabica*, as pollinator.

## 976. MEDINA, D. M.

Observações citológicas em *Coffea*. XIV. Microsporogênese em *Coffea arabica* L. var. Rugosa K.M.C. (Cytological observation on *Coffea*. XIV. Microsporogenesis in *Coffea arabica* var. Rugosa K.M.C.) [English summary  $\frac{1}{2}$  p.] *Bragantia*, 1950, 10: 61-6, bibl. 1, illus.

It is concluded that microsporogenesis is normal in *Coffea arabica* and does not appear to be related to the low productivity of the variety.

## 977. SUAREZ DE CASTRO, F.

Algunas observaciones sobre el sistema radicular de *Coffea arabica* L. (Observations on the root system of *Coffea arabica*.) *Agric. trop. Bogotá*, 1951, 7: 3: 41-7, and 4: 45-9, bibl. 13, illus.

Virtually the same, with the addition of graphs, as the article published in *Bol. inf. Colombia* [see H.A., 21: 3001, where also a correction is necessary: line 14, fo 7-0-7-3 read 5-25 and line 15 for 5-25 read 7-0-7-3].

## 978. DE URHAN, M.

Relaciones del agua en plantas de café. (Water relations in coffee plants.) *Bol. inf. Colombia*, 1951, 2: 17: 24-30, bibl. 16.

Preliminary to a study of water relations in the coffee zone of North Santander, where the rainfall is lower than in any of the other coffee zones of Colombia, the author reviews the literature on the general problem of water relations in plants, with particular reference to coffee.

## 979. VILANOVA M., T.

Caficultura. Cómo y cuándo crecen los cafetos. (Coffee cultivation. The growth rhythm of coffee trees.) *Circ. agric. Minist. Agric. Ganad. El Salvador* 20, 1950, pp. 4.

Measurements made of the seasonal growth of coffee trees at Santa Tecla at an altitude of 3,000 ft. showed that a flush of growth started in March and reached a peak at the end of June. Thereafter growth activity gradually declined and from October to February was practically at a standstill. Environmental factors appeared to have more effect on growth than physiological factors.

## 980. GARDNER, V. R.

Estudio sobre la fructificación irregular de los cafetos. (A study of the irregular fruiting habit of coffee trees.) *Agric. trop. Bogotá*, 1950, 6: 11: 53-60.

A study of the fruiting habit of coffee trees, mainly *Coffea arabica*, was made at the National Centre for Coffee Investigations, Chinchiná, over a period of 5 years, during which all seasons were favourable for production. Data are tabulated on the number of trees bearing regularly, biennially or irregularly, and the average annual yield of each group. Irregular or biennial bearing was more common than regular bearing. Irregular bearing appeared to be due to environmental conditions rather than to any hereditary tendency. No evidence was obtained for or against the theory that trees bearing regularly yield more fruit over a period of years than trees bearing biennially or irregularly.

## 981. MACHADO S., A.

El sombrío como factor interactuante en la producción del caféto (*Coffea arabica* L.). (Shade as a factor in the productivity of coffee trees.) *Bol. inf. Colombia*, 1951, 2: 16: 21-33, bibl. 27, illus.

The author follows a review of the literature on coffee shading and of the results of his own work with

a discussion of shade problems requiring immediate investigation.

## 982. CASTAÑO, J. J.

Estudio sobre el desarrollo del *Inga* Santafereno en suelos de cafetales viejos. (A study of the development of *Inga* var. Santafereno in old coffee plantations.)

*Bol. inf. Colombia*, 1951, 2: 36-46, bibl. 4.

Experiments were carried out at the National Centre for Coffee Investigations, Chinchiná, Colombia, to determine the factors responsible for the poor growth of the shade tree *Inga* Santafereno in old coffee plantations. The results indicate that the poor growth is not due to inefficiency of the nodule bacteria, or to the presence of toxic substances secreted by the roots of the coffee trees. It is probably due to a disequilibrium of nutrients in the soil, to an unsuitable soil pH and to competition for light between the *Inga* seedlings and the established coffee trees.

## 983. CORRÊA NETTO, P.

Restauração da lavoura cafeeira. (Restoration of coffee plantations.)

*Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 288-91.

The value of shading coffee plantations with *Inga* is discussed, examples being given of 3 old plantations in Brazil which have thus been restored to productivity.

## 984. DE MORAES, H.

Replantas em nossos cafêzais. (Gapping up in coffee plantations.)

*Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 282-7, 382-7, illus.

The financial losses due to tree failures, which in old coffee plantations amount to about 10% of the original stand, are shown to be very high. Gapping up in old plantations requires particular care, and the common method of planting out several seedlings together in one container usually results in failure. A method developed at the Jaú Experimental Station, which has given very satisfactory results, is described and illustrated. This consists of sowing selected seed in nursery beds and transplanting the seedlings when they have 3-4 pairs of leaves into individual containers made of pine ply wood. Six months after transplanting the seedlings should be planted out in their permanent positions in groups of 4 with 40 cm. between the plants in each group.

## 985. THOMAS, K. M.

Ways and means of increasing yield of coffee in existing plantings.

*Indian Coffee*, 1951, 15: 3-5.

Methods of increasing yields are classified into long range methods—breeding for disease resistance, vigour, regular bearing, size and shape of beans; medium range methods—selection in the field and subsequent clonal yield trials; short range methods which consist largely of agronomic experimentation. Results of some of the latter work are: Control of leaf disease by two applications per year of bordeaux mixture, the change from single stem to multiple stem pruning, and the advantages of cutting out poor bearers and replacing by good seedlings or clonal material. Manuring and liming experiments have given positive results in some

areas, but they need to be repeated in the particular areas where treatment appears to be required.

C.W.S.H.

## 986. COSTA, A. S., AND FRANCO, C. M.

A virus technique useful to diagnose foliar deficiencies.

*Plant Physiol.*, 1951, 26: 625-8, bibl. 3, illus.

Spraying iron salts on chlorotic leaves of coffee plants [*Coffea dewevrei*] induced practically no response, whereas the application of the same solutions followed by rubbing with carborundum resulted in a strong greening of the treated half-leaves. The use of the abrasive with water or solutions of other salts did not cause any reaction. These facts indicate that the penetration of the iron solution was greatly favoured by the slight mechanical injury caused by carborundum. It is not known whether the application of solutions by rubbing with the help of carborundum will be more effective than spraying in the case of other plants. In preliminary tests not described in this paper, this technique was useful to diagnose deficiencies shown by citrus leaves. It is to be expected that the use of an abrasive will be more advantageous in tests diagnosing deficiencies in plants which possess a more impermeable cuticle, but the method might promote a quicker response to treatment even from plants which react to spray applications. The results obtained with chlorotic coffee plants suggest that the application of iron salts, or perhaps salts of other elements, on the leaves of orchard plants to correct symptoms of deficiency might be greatly helped, if spraying is done with high pressure, by mixing an abrasive in the solution to be sprayed, or by other methods aimed at overcoming the resistance offered by the leaf against penetration of the solutions. [From authors' discussion.]—Instituto Agronômico, Campinas, Brazil.

## 987. CRANDALL, B. S., AND PATIÑO, B.

El mal del talluelo del café. (Damping-off of coffee seedlings.)

*Circ. agric. Minist. Agric. Ganad. El Salvador* 1, 1950, pp. 4.

Damping-off, caused by *Pellicularia filamentosa* (= *Rhizoctonia solani*), is liable to attack coffee seedlings 7-10 days after germination. Experiments made at the National Centre of Agronomy, Santa Tecla, have shown that excellent control can be obtained by watering with a solution of 45 g. yellow cuprocide, 60 g. perenox or 18 g. wettable spergon in 2 gal. water per 24 sq. ft. of seedbed. Treatment should begin 7 days after germination or at the first sign of infection and be repeated weekly until the first or second true leaf appears.

## 988. URHAN, O.

Laga y marchitamiento del cafeto causado por *Myrothecium roridum* Tode. (A canker and wilt of coffee caused by *Myrothecium roridum* Tode.) [English summary ½ p.]

*Bol. inf. Colombia*, 1951, 2: 16: 33-45, bibl. 13, illus.

Inoculation experiments, mycological studies and observations were made at the National Centre for Coffee Investigations, Chinchiná, Colombia, on a hitherto unknown disease of coffee trees in the nursery, caused by *Myrothecium roridum*. The fungus caused stem cankers, wilting of seedlings and a leaf spot.

*Coffea robusta*, *C. liberica* and *C. arabica* vars. Nacional, Bourbon, San Ramón and Maragogype were equally susceptible to the disease. The optimum temperature for development of the fungus was about 27° C., normal development being inhibited at temperatures above 30° C. The fungus was tolerant of a wide range of pH in the culture media, and its rate of growth was only reduced on very acid (pH 2.8) or very alkaline (pH 9.2) media. The formation of stem cankers was inhibited by a relative humidity below 64%. The isolate produced a severe dermatitis on the human skin. Suggested measures for preventing the spread of the disease include control of humidity in the nursery, destruction of infected plants, disinfection of the grafting knife and the use of a new protective cover for each graft.

989. NOTLEY, F. B.

A note on *Antestia* control with D.D.T. and bordeaux mixture.

*E. Afr. agric. J.*, 1951, 16: 131-2, bibl. 3.

The practice at the Coffee Research Station, Lyamungu, of adding 0.05% DDT to  $\frac{1}{2}$ % or 1% bordeaux sprays used before and after the rains has resulted in complete absence of *Antestia* from the station. As a result it was possible, at the last spraying, to do without DDT in the spray. Very little reinfestation has taken place from surrounding coffee. C.W.S.H.

990. NOTLEY, F. B., AND TAPLEY, R. G.

A note on white borer of coffee.

*E. Afr. agric. J.*, 1951, 16: 130, bibl. 1.

An insecticide mixture, applied at a rate which provided 3 lb. Paris green and 3 lb. lime casein per acre at the beginning of the rains, caused a reduction of 37% compared with control in the number of young larva of *Anthonus leuconotus* found in the trees at the end of July when all the new generation had hatched. It is considered that further work on these lines may yield valuable results since the flight of the adult is restricted to a few months during the rains.

991. GUISCAFRÉ-ARRILLAGA, J.

Nueva plaga en El Salvador: el grillo haitiano del café. (A new pest in El Salvador: the Haitian coffee tree cricket.)

*Circ. agric. Minist. Agric. El Salvador* 22, 1950, pp. 4, illus.

A pest of coffee, hitherto unknown in El Salvador, has recently been found in a plantation near Santiago de Maria. It is very similar to, and possibly identical with, the Haitian coffee tree cricket (*Chremom repentinus*) reported from Haiti in 1931. The cricket causes damage by making circular wounds 3-4 mm. in diameter in the young stems of coffee trees in which the eggs are laid. Damaged shoots should be cut off and burnt to destroy the eggs. When egg laying begins the plants may be sprayed with a solution of lead arsenate at 100 g. to 15-20 l. water. Further investigations on the pest are being carried out by the National Centre of Agronomy, Santa Tecla.

992. CARVALHO, J. C.

Nematóides semi-parasitas ou saprófitas? (Nematodes [on coffee roots]: semi-parasites or saprophytes?) [English abstr. 8 lines.] *Rev. Agric. Piracicaba*, 1951, 26: 219-29, bibl. 18, illus.

A study was made of the free-living nematodes which occur on the diseased roots of coffee trees. The following genera were found on the roots examined: *Rhabditis*, *Diploscapter*, *Cephalobus*, *Plectus*, *Cheilobus* and *Aphelenchus*. It is considered that species of *Aphelenchus* and *Diploscapter* are probably semi-parasites, whereas the other genera appear to live in the soil in the neighbourhood of diseased roots and probably feed on bacteria or their products.

993. ANON.

Conselho para o combate ao "bicho mineiro" nos cafezais. (Recommendations for the control of coffee leaf miner.)

*J. Noticias*, 19 Nov. 1950, reprinted in *Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 568-70.

Attacks by the coffee leaf miner [*Perileucoptera coffeella*] have recently been very severe in the interior of Brazil. An account is here given of the life history of the pest and methods of control, based on work carried out at the Instituto Biológico, São Paulo. The adults can be controlled by an application of BHC dust, 1% gamma isomer, at the beginning of the dry season (April or May). This should be repeated after 20-25 days to control the adults of the second generation. Chemical treatment must be supplemented by the addition of organic matter to the soil, as the pest causes less damage to healthy trees. Fallen leaves often harbour the pupae and should be buried with the organic matter at a depth of 30 cm.

994. GOMES, J.

Como reconhecer o piolho branco e combater essa praga no cafézal. (Recognition and control of the mealybug [*Pseudococcus* sp.] on coffee.)

Reprinted from *O Tempo, Brazil*, 25 February 1951, in *Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 415-16.

The *Pseudococcus* mealybug attacks leaves and roots of coffee trees causing fruit fall and, in some cases, death. It forms an association with red ants. On the leaves the pest may be controlled by sprays of "Albolineum" or "Citro-Mulsion" at a concentration of 1:100. For root attacks no satisfactory control is known.

995. MENDOZA, R. G.

"Palomilla" del cafeto. (Coffee mealybugs.)

*Bol. Ext. Fed. nac. Cafeteros*, 1951, No. 8, pp. 4.

Notes are given on the pest, its damage and control, cultural and chemical. Insecticides which have given effective control in tests made by the National Centre for Coffee Investigations, Chinchiná, Colombia, are chlordane, Agrocide, Creolina + DDT, cyanide + DDT, and Otaba emulsion + DDT.

996. TOSELLO, A.

Ensaíos sobre a colheita do café. (Coffee harvesting trials.)

*Bol. Super. Serv. Café, S. Paulo*, 1951, 26: 108-12, 479-82, bibl. 3, illus.

As a basis for future work on mechanical coffee harvesting a study was made of the relative importance of the individual operations involved in manual



harvesting on typical coffee plantations in the north-eastern and Araraquarenses zones of Brazil. Records were made of the labour required for the following operations: (a) shaking the coffee from the trees, (b) collecting the fallen coffee and separating it roughly from refuse with a rake, and (c) sieving, sacking and carrying. These operations took about 60%, 30% and 10% respectively of the total time required for harvesting. One man could harvest 80 trees in 10 hours.

997. CHOKKANNA, N. G., AND THOMAS, K. M.

Hints on Robusta pulping.

*Indian Coffee*, 1951, 15: 21-2.

As a result of trials carried out at the Coffee Research Station information is given about the machinery to use and the best methods of soaking, sieving and fermenting and washing robusta coffee. Early season coffee can be pulped at once, but later 12-24 hours pre-soaking is necessary. A method of hastening fermentation is described.

C.W.S.H.

998. CALLE, H.

Ensayo sobre cultivo de levaduras alimenticias en pulpa de café. (An experiment on the culture of food yeasts on a medium of coffee pulp.)

*Bol. inf. Colombia*, 1951, 2: 14: 33-6, bibl. in text.

If coffee is depulped by the dry method the pulp and mucilage which is normally wasted can be utilized very satisfactorily as a medium for the culture of food yeasts, such as *Torulopsis utilis*.

### Guava.

999. LE RICHE, F. J. H.

Chemical changes during the development of some guava varieties.

*Sci. Bull. Dep. Agric. S. Afr.* 286 (*Fruit Res. tech. Ser.* 21), 1951, pp. 16, bibl. 8, 3d.

The 8 varieties tested at the Western Province Fruit Research Station varied in their ripening period from March-May (Early Red) to July-October (Rousseau and Frank Malherbe) and in the colour of the flesh from white (Salmonsvei White) via yellow-pink (Madeira) to dark pink (Hugo Red and Frank Malherbe). Changes, so far as it was possible, were noted in acidity, soluble solids, sugars, alcohol-insoluble residues, nitrogen and ascorbic acid. The fruits were found to be the richest parts of the plant as regards ascorbic acid. In the late varieties the concentration rises to 1,000 mg. per 100 g. fresh material. The rate of development of the ascorbic acid was basically the same in all varieties. At first it is very slow. The second stage is one of rapid increase until a maximum is reached in the fully ripe fruit. This period corresponds with the period when the seeds have completed their development and cell enlargement has become more important than cell division.

1000. ANDRADE, A. C.

A ferrugem da goiabeira e seu controle.

(Guava rust and its control.)

*Biologico*, 1951, 17: 103-8.

Guava rust, caused by the fungus *Puccinia psidii*, causes serious damage to leaves, flowers and fruit of

the guava. The symptoms are described. Trials were carried out in Brazil from 1943 to 1950 to determine the effectiveness of various fungicides for its control. None of the sulphur preparations gave satisfactory control, nor did the organic fungicides Fermate and Parzate. The most effective of the materials tested was bordeaux mixture. On the basis of these results the following spray programme is recommended: applications of 1% bordeaux mixture after the first winter rains and after the guavas come into leaf, followed by monthly applications until December or January. A more detailed account of the work is to be published later.

### Mango.

1001. ROY, R. S., MALLIK, P. C., AND DE, B. N.  
Manuring of the mango (*Mangifera indica* Linn.).

*Proc. Amer. Soc. hort. Sci.*, 1951, 57: 9-16, bibl. 15.

Growth records are given, for the seasons 1947-8 and 1948-9, of an NPK experiment established in 1937. N, as ammonium sulphate, produced the greatest response, and small further responses were obtained from the addition of P and K. No response was obtained, however, from P or K without N. Although there are three vegetative flushes per year, flowering only takes place in February-March. To increase flowering N applications are best made in June, though if farmyard manure is used it may be applied in October. The recommended method of manuring is to apply ammonium sulphate and half the K dressing in June, and farmyard manure, phosphate and the remaining K in October, and to double the N application in a free-flowering "on" year.

C.W.S.H.

1002. LATIF, A., AND QAYYUM, H. A.

The use of synthetic insecticide (Guesarol 550) against mango-hopper.

*Punjab Fruit J.*, 1950, 14: 49: 6-7, bibl. 7.

In trials during 1949 and 1950 at Montgomery and Lyallpur agricultural stations spraying in April or May with Guesarol 550 (DDT) at the rate of 1 lb. in 300 lb. water produced 100% mortality of hoppers (*Idiocerus clypealis* and *I. atkinsoni*) in 3-4 days with a residual effect lasting 4-5 days. By comparison spraying with rosin soap at 1 in 160 gave much less efficient control at higher cost.

### Oil palms.

(See also 928, 1046k.)

1003. SHEPSTONE, D.

The oil palm in western Tanganyika.

*E. Afr. agric. J.*, 1951, 16: 126-30, bibl. 3.

Oil palms in Tanganyika are confined to a strip of country along the shores of Lake Tanganyika. Rainfall is 30-40 inches and altitude between 2,000 and 4,000 ft. Five types are recognized by local names and these belong to the three varieties dura, virescens and tenera. The pericarp oil is extracted by a primitive native "soft oil" process. The nuts are cracked by hand and the kernels sold. Palm wine is made from sap extracted from felled palms; such felling is, however, controlled by a system of permits. The

palms are attacked by the beetle *Oryctes monoceros* and the weevil *Rhynchophorus phoenicis*. Other pests are an aphid, a scale and a dryastid beetle. Some of the improvements in cultivation and processing are: thinning out and cutting, seed selection, the proper disposal of dead palms, the erection of modern factories and the establishment of new areas in districts at present unoccupied. C.W.S.H.

1004. WRIGHT, J. O.

**Unusual features of the root system of the oil palm in West Africa.**

*Nature*, 1951, 168: 748.

The roots of the oil palm, *Elaeis guineensis*, growing in the deep acid sands of West Africa, were studied and grouped into primary, secondary, tertiary and quaternary. The directions in which they grow and the soil layers in which they are predominant are noted. It is found that the root system undergoes constant renovation. The practical application of this work is that mineral fertilizers need not be worked into the soil, as they are likely to become more readily absorbed if applied to the surface, and that mechanical cultivation between the rows will do very little damage to the roots.

*Palm species.*

1005. DAVIS, T. A.

**Dichotomy in certain branched palms.**

*Indian Coconut J.*, 1950, 4: 36-43, bibl. 16, illus.

The true nature of bifurcation of stems of many palm species is discussed. The author considers that many branched palms are genuine cases of dichotomy, i.e. the division into two branches of the apical meristem of a stem, as exemplified by the Lycopodiaceae. He disputes the conclusions of Ridley that all bifurcations are due to the development of a lateral bud, and of Morris that this follows injury to the terminal bud; and he cites instances of bifurcated *Palmyra* and date palms which he considers to exhibit true dichotomy. Fasciation is thought to be a similar phenomenon to dichotomy. The branching of the species of *Hyphoene* is discussed. C.W.S.H.

*Papaw.*

(See also 927.)

1006. CHATEAU, R. P.

**Le papayer. (Papaw.)**

*Havre-Colon.*, 1950, 14/17: 24: 42, bibl., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 83.

An account is given of the botany, varieties, culture, pests and diseases of the papaw, with some economic data and notes on its food value and uses.

*Pineapples.*

(See also 845, 927, 1046g.)

1007. ALLNUT, R. B.

**Pineapple possibilities in the Leeward Islands.**

*Mon. Inf. Bull. Caribb. Comm.*, 1950, 4: 535-7, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 84.

Information is given on the soils and climate of the Leeward Islands in relation to the possibility of pineapple production. St. Kitts, Montserrat and the south-west portion of Antigua are considered suitable. Control of black spot (*Bacillus ananas*) and problems of transport and marketing are considered. Culture on a plantation scale is thought to be most suitable. [Noted *H.A.*, 21: 4080b.]

1008. SIDERIS, C. P., AND YOUNG, H. Y.

**Growth of *Ananas comosus* (L.) Merr., at different levels of mineral nutrition under greenhouse and field conditions. II. Chemical composition of the tissues at different growth intervals.**

*Plant Physiol.*, 1951, 26: 456-74, bibl. 16, being *Tech. Pap. Pineapple Res. Inst. Hawaii* 200.

This report supplements an earlier paper on the growth rates, and water and mineral nutrient intake of pineapple plants [see *H.A.*, 21: 2066]. Data are here presented on the chemical composition (total nitrogen, soluble organic nitrogen, potassium, calcium, reducing and total sugars) of the leaf and stem tissues at different growth intervals of pineapple plants grown in nutrient solutions in the greenhouse and in soil under field conditions with different amounts of nitrate, potassium and calcium.

1009. WOLFENBARGER, D. O.

**Control of the pineapple mealybug.**

*A.R. Fla agric. Exp. Stat. for 1949-50*, pp. 242-3.

The pineapple mealybug, *Pseudococcus brevipes*, was controlled more effectively with parathion than with oil emulsion sprays. Pineapple red spider, *Stigmaeus floridanus*, infestations of the outer leaves were reduced by a number of miticides. The materials failed to contact the mites between the tightly appressed basal portions of the inner leaves.

*Rubber.*

(See also [Hevea 928, 929, 1046v, z], other rubbers 759-765, 770f.)

1010. CRAMER, P. J. S.

**High yielding rubber material.**

*Planter, Kuala Lumpur*, 1950, 26: 488-91, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 118.

Data on the productivity of the new Java and Sumatra rubber clones and seedlings.

1011. VAN SCHOONEVELDT, J. C.

**Het paggerplantverband bij rubber. (Hedge planting of rubber.)**

*Bergcultures*, 1951, 20: 187-99, bibl. 5, illus.

The theoretical advantages of planting rubber trees on the hedge system are summarized, and the results of several trials are recorded to support or refute these claims. They show that stem thickness and bast thickness are negatively correlated with planting distance in the row, but are not affected by planting distance between the rows, above 10 m. During the first year of tapping highest yields per ha. were obtained from the closest spacings. There was no evidence, however, that hedge planted trees yielded better than

normally spaced trees with the same stand per ha. With the hedge system selective thinning of seedlings must start earlier than with the normal planting system.

## 1012. CONSTABLE, D. H.

**Fertilisers in rubber.**

*Adv. Circ. Rubb. Res. Scheme Ceylon* 30, 1951, pp. 2.

In making specific practical recommendations for rubber manuring the author notes that long term manurial trials at Dartonfield show that up to 7 years phosphorus is beneficial, nitrogen is neutral and potash has a slightly adverse effect on rubber. Once tapping begins none of these effects is so marked. Potash, moreover, would appear to benefit the cover crop and there are indications that it helps rubber on flat land.

## 1013. CARPENTER, J. B.

**Target leaf spot of the *Hevea* rubber tree in relation to host development, infection, defoliation and control.**

*Tech. Bull. U.S. Dep. Agric.* 1028, 1951, pp. 34, bibl. 17, illus.

The investigations reported fall into four distinct parts: a study of the development of the leaf flush, the effect of controlled defoliation (simulating target spot effects) on seedling growth, fungicidal control of target spot (*Pellicularia filamentosa*), and the resistance of various *Hevea* species and clones to the disease. Leaf expansion, which occurs simultaneously in breadth and length, is concluded in 15-21 days. Season affects leaf size, but not rate of unfolding. Expansion continues by day and night. Seedlings which were defoliated to the extent of 20% and 40% made satisfactory growth, but with 60% and 80% defoliation growth was depressed and buddable seedlings were few. Heavily defoliated seedlings flushed more frequently. These results indicate that fungicidal treatment is only worth while during the months when target spot attack is severe. Moreover the pendant habit of young leaves makes application difficult until the leaves are fully mature. Most leaves are susceptible to infection by basidiospores for less than a week after unfolding from the growing point. Weekly applications in the rainy season of fungicidal sprays or dusts controlled target spot. Insoluble copper fungicides have given satisfactory control as a nursery spray, though the best spray tried was Wettable Spergon. A combination of dusting sulphur and Fermate was the best dust, but spraying is recommended. Clones of *H. brasiliensis* were all susceptible, though, in field plantings, FB54 and FB3363 were tolerant. *H. rigidifolia* is highly resistant and some clones of *H. benthamiana* and *H. pauciflora* are tolerant.

## 1014. VAN ALPHEN, J.

Quebrachitol, een nieuwe polyalcohol voor de bereiding van synthetische harsen voor de lakindustrie. (Quebrachitol, a new polyalcohol for the preparation of synthetic resins for the lacquer industry.)

*Verfkronek*, 1951, 24: 2: 48-9, from abstr. in *Documbl. trop. Prod. Amst.*, 1951, 6: 250.

The preparation, properties and technical applications of quebrachitol are dealt with. It is a constituent of the serum of rubber latex, which is at present wasted.

**Sugar cane.**

(See also 694, 935, 1046a, b, e, f, i, m, p; q, 1077, 1078, 1094, 1097, 1099.)

1015. HAWAIIAN SUGAR PLANTERS' ASSOCIATION.  
**Sugar in Hawaii.**

[Publ.] *Hawaiian Sugar Plant. Ass.*, 1949, pp. 96, bibl. 17, illus. [received 1951].

This bulletin written in clear, attractive style for the general public gives an excellent idea of the practical work of the sugar growers and manufacturers of Hawaii and of some of their difficulties. By the U.S. Sugar Act of 1948 the Hawaiian sugar quota was fixed at 1,052,000 tons.

## 1016. STEVENSON, G. C.

**Report on a visit to Guadeloupe.**

*Bull. B.W.I. centr. Sugar Cane Breed. Stat. Barbados* 35, 1951, pp. 12, bibl. 4.

Sugar cane is grown on Guadeloupe island itself and the neighbouring island of Grand Terre. The rainfall varies from 45 to 110 inches per annum, and the soils fall into groups II and IV of Turner's sugar cane soil classification. The former soil requires cultivation but no drainage, while the latter is heavy and usually alluvial and needs artificial drainage and cultivation. Planting is in two seasons and cultivation is mechanized. There are no serious pests. B.H.10(12) and P.O.J.2878 were previously the standard varieties grown, but recently they have been replaced by B.37161, B.37172 and B.34104 in Guadeloupe island, while in Grand Terre P.O.J.2878 still occupies half the area and B.37161, B.34104 and B.4098 are also in large-scale cultivation. Many varieties are under trial. Recommendations are made for the replacement of P.O.J.2878 by Barbados varieties, for the planting of individual varieties under specified conditions, and for the testing of further Barbados varieties. C.W.S.H.

## 1017. MACGIBBON, J. M.

**On the making of a price scale for payment of cane.**

*Proc. Qd Soc. Sugar Cane Tech.*, 1951, 18: 7-13, bibl. 3.

In Queensland the sliding price scale used for the payment of cane is based on the percentage of commercial cane sugar (C.C.S.) in each consignment with an adjustment to allow for the rise in the cost of extraction which occurs as the C.C.S. declines. The scale is adjusted annually to bring it into line with the base price of 94 N.T. sugar. The calculations on which the scale is based are described in detail in this paper.

## 1018. ANON.

**Hawaii tries new planting scheme.**

*Sugar*, 1951, 46: 3: 48.

Workers at the Hawaiian Sugar Planters' Association Experiment Station have had a successful preliminary trial of a "pineapple" row method of planting cane. They planted 2 rows of cane close together and separated them from the next twin rows by a wide furrow. Tested against normally planted cane results were as good and in fact excellent. The most important achievement was, however, the elimination of the weed problem by the close spacing of the young cane.



1019. ANON.

**Hilo plantation tries hydroponic growing of cane seedlings.***Sugar*, 1951, 46: 5: 38.

The upland fields of the Hilo sugar plantation in Hawaii are too wet and cold for proper seed germination. Raising seedlings in water boxes containing cinders appears to result in better germination. A trial is in progress.

1020. STEVENSON, G. C.

**Report on the sugarcane variety situation in Jamaica, April 1950.***Bull. B.W.I. centr. Sugar Cane Breed. Stat. Barbados* 32, 1950, pp. 8.

The main varieties grown in Jamaica are B.34104 (occupying about 50% of the acreage), B.3439 (21%), B.37172 (5%), B.37161 (4%), P.O.J.2878 (4%), B.H.10(12) (3%) and M.28 (1%). The performance of the first four of these is described in some detail. Particular emphasis is placed on the mosaic susceptibility of B.34104, which has made all attempts to maintain clean stocks unsuccessful; despite virtually 100% infection, however, this variety has been so tolerant to the disease that it has proved generally superior to any resistant variety available. It has been easier to maintain clean stocks of the less tolerant B.3439 by roguing and this variety has also proved resistant to leaf spot caused by *Helminthosporium sacchari*. B.37172 has proved very resistant to mosaic disease, and B.37161, though highly susceptible, appears to be quite tolerant. Of the newer Barbados seedlings under trial those showing most promise are B.41227, B.4362, B.4226, B.42231, B.43214, B.44254 and B.44341. The report discusses the breeding and testing of mosaic-resistant seedlings for Jamaica, and concludes with recommendations on the testing and multiplication of new varieties in that colony.

1021. RAGHAVAN, T. S.

**The sugarcanes of India. Some cytogenetic considerations.***J. Hered.*, 1951, 42: 199-206, bibl. 22, illus.

A review of the work of the Sugarcane Breeding Station, Coimbatore, on the constitution of *Saccharum officinarum* and the interrelationship of the various species of *Saccharum* and allied genera.

1022. BUREAU OF SUGAR EXPERIMENT STATIONS.

**Expedition brings new canes from New Guinea.***Aust. Sugar J.*, 1951, 43: 253, 255, 257, 259, 261, 263, 265.

A preliminary account of a sugar cane collecting expedition to New Guinea shows that J. H. Buzacott and C. G. Hughes returned with 165 varieties of cane, most of them being sweet "noble" canes suitable for testing as commercial canes, others being hardy wild varieties suitable for use in breeding. The sweet canes are grown by the natives in gardens among sweet potatoes, bananas, yams and other food crops. Most of the canes were collected in the central highlands at an altitude of 5,500 to 8,500 feet. Some of the diseases noted were unknown in Queensland, which justified the stringent quarantine restrictions imposed on the canes actually introduced. A separate report is in preparation on pests and diseases encountered. A note is

given on 6 previous cane-collecting expeditions to New Guinea.

1023. BIRKETT, C. B.

**Development of new cane in Mauritius results in record sugar production.***Foreign Trade, Ottawa*, 1951, 9: 369-70, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 271.

The most important factor in the record crop of sugar (416,000 tons) produced in Mauritius in 1949 was the use of the new cane variety M134/32.

1024. BRANDES, E. W., AND MCGUIRE, R. C.

**Auxin-thermal relations in cell growth and geotropic reaction of sugarcane.***Amer. J. Bot.*, 1951, 38: 381-9, bibl. 7, illus.

Sugar cane stems show a marked negative geotropism when placed on the ground, the apical end bending upwards in 3 or 4 days. This bending is caused by growth of the lower side of the "growth ring" immediately above the root band which contains the stem root primordia and dormant bud. Geotropism was inhibited by immersing cuttings in water at 52° C. for 20 mins. This was due to a lowering of the auxin level, and the geotropic reaction could be partly restored by immersing the treated stems in 100 mg./l. indoleacetic acid. Microscopical examination of the tissues concerned showed that the geotropic response was due to cell elongation and to cell division in the early stages.

C.W.S.H.

1025. LOCSIN, C. L.

**Water, soil and sugarcane.***Sugar News*, 1950, 26: 571-4, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 174.

The effect of the drought of 1949 on the yield of various sugar cane varieties in the Philippines was studied, measurements of stem weight and length and results of sap analyses being recorded. The relative importance of water and nutrient supply is considered for different soils.

1026. HALAIS, P.

**Une alimentation décroissante en eau et en azote, favorable à la maturation de la canne.***(Decreasing the amounts of water and nitrogen favours maturity in sugar cane.)*  
*Rev. agric. Maurice*, 1951, 30: 169-74, bibl. 7.

The author quotes figures from Mauritian records which support Clements's recent finding in Hawaii that for proper and economic maturity of cane it is essential not to add nitrogenous fertilizer or water too late in the season or low quality cane will result, despite the fact that a larger tonnage may thus be achieved. He considers it possible that breeding and selection may produce a cane which will be able to benefit from late applications. Until then care is necessary.

1027. ANON.

**Plastic flumes for irrigation.***Sugar*, 1951, 46: 9: 54-5.

A note of the use in Hawaiian sugar fields of a plastic irrigation flume 40 times lighter than the concrete type, one 15-ft. section weighing 24 lb. It is composed of laminated paper completely impregnated with a phenolic type resin. It is expected to last 10 years.

1028. ORIAN, G.

**Lightning and the sugarcane.***Rev. agric. Maurice*, 1951, 30: 31-2, illus.

Patches, generally circular, of sugar cane killed by lightning are sometimes mistakenly attributed to an unknown disease. Three such examples are mentioned here and the characteristic symptoms of lightning injury described in detail. Diagnosis is usually easy in tall canes, but may be difficult in young plants or ratoons that have not yet formed a stalk.

1029. FLORES A., M. A.

**El mosaico de la caña de azúcar. (Sugar cane mosaic.)***Circ. agric. Minist. Agric. El Salvador* 33, 1951, pp. 4, illus.

Most of the sugar cane in El Salvador is infected with mosaic, a virus which is spread by *Aphis maidis*. The control measures recommended are (1) replacement of susceptible varieties by resistant ones, (2) selection of healthy propagating material, and (3) eradication of diseased plants in the field. The resistance and cropping capacity of 18 imported varieties that have been tested at the San Andrés Experimental Station are tabulated.

1030. WIEHE, P. O.

**Leaf scald and chlorotic streak; two sugar cane diseases occurring in British Guiana.**

Printed by Daily Chronicle Ltd., Georgetown, Demerara, 1951, 33 pp., bibls. 44 and 17.

Leaf scald of sugar cane is due to the bacterium *Xanthomonas albilineans*. Control measures urged are: (1) Short-term measures: Substitution of less susceptible varieties, surveys to find infected sources, roguing of infected stools, sterilization of knives at planting, roguing in fields to be harvested, sterilization of knives at harvest, destruction in infected fields of susceptible varieties, improvement of environmental conditions. (2) Long-term control measures: Breeding of highly resistant or immune varieties, a policy adopted with success in Java, Australia, Hawaii and Mauritius. Chlorotic streak is an insect-transmitted virus. Control measures recommended for British Guiana include roguing of diseased stools in nursery and drainage improvement.

1031. HIRSCHHORN, E.

**Caracteres del ciclo evolutivo del carbón de la caña de azúcar (*Ustilago scitaminea*). (The developmental cycle of sugar cane smut (*Ustilago scitaminea*)).**

*Rev. Invest. agric. B. Aires*, 1950, 4: 317-24, bibl. 15, illus., being *Publ. Inst. Fitotec. Minist. Agric.* 100.

A study is reported of the life cycle of the fungus in Argentina and of the behaviour of the nuclei during the various phases of development.

1032. GORDON, A.

**Effect of *Cercospora* leaf spot of sugar cane on juice.**

*Sugar News*, 1950, 26: 569-70, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 175.

An account is given of the occurrence of *Cercospora* leaf spot on sugar cane in the Philippines, where it

causes a reduction in yield of about 16%. For control the application of trash a month before harvesting is recommended. The trash should be burnt on the field after harvest.

1033. WONG, S.-C., AND TSAI, T. K.

**Studies on red rot of sugarcane in Taiwan.****Part I. Symptoms, structure, ascigerous stage, and life history of the pathogen.**

[Chinese with English summary.]

*Rep. Taiwan Sug. Exp. Sta.*, 1950, 5: 99-109, illus., from abstr. in *Rev. appl. Mycol.*, 1951, 30: 543-4.

One of the most important diseases of sugar cane in Formosa is red rot (*Phylospora tucumanensis*). Since its discovery on the island prior to 1910 the fungus has been an annual source of industrial losses, besides contributing from time to time to the decline of several varieties. The symptomatology of the disease and the morphology and life-history of the causal organism are described. The disease is spread from one plant to another throughout the rainy season by wind or rain. Before the onset of this period the dry and the diseased leaves from living plants should be collected and burnt.

1034. OTANES, F. Q.

**The most important pests of sugar cane and suggestions for their control.**

*Sugar News*, 1950, 26: 453-7, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 21.

The biology and control of sugar cane pests in the Philippines are described, including cockchafers, termites, borers, rats, grasshoppers, caterpillars and aphids.

1035. INGRAM, J. W., AND OTHERS.

**Pests of sugarcane and their control.**

*Circ. U.S. Dep. Agric.* 878, 1951, pp. 38.

Nearly half of this bulletin is devoted to sugar cane borer (*Diatraea saccharalis*). Others dealt with more shortly include the beetle (*Eutheola rugiceps*), the grey mealybug (*Pseudococcus boninensis*), the weevil (*Anacetrinus subnudus*) and some 16 others.

1036. GALLO, D.

**Pulgões da cana de açúcar. (Sugar cane aphids.)**

*Rev. Agric. Piracicaba*, 1951, 26: 13-20, bibl. 3, illus.

Two species of aphid, *Rhopalosiphum maidis* (= *Aphis maidis*) and *Aphis sacchari*, attack sugar cane and cause damage by sucking the sap, encouraging ants and the growth of sooty moulds, and transmitting virus diseases. Data are given on the reproductive capacity of the aphids and recommendations are made for control. The most economic and efficient method is biological control by *Cycloneda sanguinea*. Chemical control may be obtained with 0.25% Rhodiatox dust, a Rhodiatox spray of 1 kg. in 500 l. water, or 1.5% BHC.

1037. GALLO, D.

**A introdução da *Lixophaga diatraeae* em nosso meio. (The introduction of *Lixophaga diatraeae* into Brazil.)**

*Rev. Agric. Piracicaba*, 1951, 26: 117-26, bibl. 4, illus.

Notes are given on the value of *Lixophaga diatraeae* for the biological control of sugar cane borer, its introduction into Brazil, and the method of rearing the parasite in the laboratory.

1038. ANON.

New cane cutting machines under trial at Lihue [Hawaii].

*Sugar*, 1951, 46: 8: 42.

Lihue's cutters are modifications of the machine developed by the Hawaiian Sugar Planters' Association which can both cut and windrow cane mechanically.

1039. ANON.

Mechanized disposal of cane trash.

*Sugar*, 1951, 46: 7: 32-3.

An illustrated account of the Stubbs cane cultivator made by the General Farm Equipment Company of San Juan, Porto Rico. It is mounted on an Oliver-Cletrac crawler tractor and distributes trash so that there are alternate "clean rows" and "trash rows".

### Tea.

(See also 934, 1046j, 1096, 1100.)

1040. VAN DIJK, G.

Oostmoesson-theezaad. (Tea seed harvested during the east monsoon.)

*Bergcultures*, 1951, 20: 145-7.

The present shortage of tea seed makes it desirable to use all available supplies. Seed harvested during the dry season of the east monsoon presents a problem, as immediate sowing involves very careful watering and shading and an increased risk of damage from eelworm. Two possible solutions are offered. (1) The air-dried seed may be stored in boxes in pits 3 ft. deep and covered with straw and soil, until the season is more suitable for sowing. After 5-6 months about 60% of the seed is viable. Details of the procedure are given. (2) The fresh seed may be sown thickly (4×4 cm.) on steam-sterilized seedbeds and planted out in the nursery 3 months later. In this way the expenses of watering, etc., are kept to a minimum and the seedlings are not exposed to eelworm attack until their roots are fairly resistant.

1041. VAN HELL, W. F., and VEENSTRA, H.

Het doden van schaduwbomen met behulp van natriumarseniet. (Killing shade trees with sodium arsenite.) [English summary ½ p.]

*Bergcultures*, 1951, 20: 27-9.

When blister blight appeared in Sumatra it became necessary to remove as quickly as possible the majority of the shade trees in tea estates. There was not enough labour to fell them, and ringing was too slow in its effect. It was found, however, that if the barkless strip were smeared with a 50% solution of sodium arsenite immediately after ringing the trees would lose the greater part of their leaves within 2-3 weeks. This was the case with *Albizzia sumatrana*, *Gliricidia sepium* and *Deguelia microphylla*. With species such as *Albizzia falcata* that reacted slowly the cambium had to be scraped off after removal of the bark. The cost of treatment was estimated at 15 cents a tree. A fuller account of this work is to be published later.

1042. SARMAH, K. C.

Lightning.

*Tocklai Serial* 87, 1951, p. 1.

Although the exact effect of lightning on the soil is unknown, it is believed seriously to upset the micro-biological balance, so that neither crop plants nor weeds are likely to thrive for some time. The following recommendations are made for areas struck by lightning: Bushes killed should be grubbed at once and, when feasible, the top 1 foot of soil should be replaced with fresh soil rich in organic matter. If this is impracticable heavy organic manuring should be carried out. The area should then be put under a green crop, e.g. *Crotalaria anagyroides*, for at least a year before replanting.

1043. VAN EMDEN, J. H.

Aantekeningen over enige ziekten en plagen van de thee (aaltjes, helopeltis en blister-blight). (Notes on some pests and diseases of tea: eelworms, helopeltis and blister blight.) [English summary ½ p.]

*Bergcultures*, 1951, 20: 152-67, bibl. 2, illus.

Some of the recent findings of the C.P.V. Experiment Station are dealt with. *Eelworms*: In order to estimate the risk of planting tea on eelworm-infested land, the area should be divided into  $\frac{1}{10}$ -acre plots, each of which is sown with 1 m<sup>2</sup> of *Tephrosia vogelii*, as an indicator. If infestation is only slight tea may be safely planted, provided the seed is sown early in the season, shade is provided, and special care is given to drainage and soil reaction. Two-year-old plants from infected nurseries may safely be used as planting material as the large roots retained in stump planting contain few if any eelworms. In Java *Heterodera* has only been found to cause damage to young tea plants. In infected areas it may be advisable to raise the seedlings on steam-sterilized soil for the first 3 months. *Helopeltis*: There are strong indications that the formation of branch cankers as a result of helopeltis attack is dependent on the physiological condition of the plant. Two applications of DDT, applied with a 10-day interval at the rate of 250 g. per ha., are sufficient to keep a plantation free from helopeltis for many months. Application by portable mist blowers has proved very satisfactory. *Blister blight*: In order to avoid blister blight, growers are advised to reduce the shade of overgrown plantations as soon as possible. New plantations should be laid out with roads along the contour every 50 m. to facilitate mechanical control of blister blight, should it occur.

1044. VAN EMDEN, J. H., and VAN HELL, W. F.

Blister blight. [In Dutch.]

*Bergcultures*, 1951, 20: 7-9.

The conclusions of the 9th Biennial Conference of the Tea Research Institute of Ceylon, held in December 1950, are here summarized. The damage caused by blister blight in Ceylon is estimated as small on estates below 2,000 ft., 5-15% on estates at 2,000-4,000 ft., and 5-20% on estates above 4,000 ft. Infected bushes, moreover, were considered to be more susceptible to eelworm attack and to regenerate more slowly after pruning. Cultural methods of control were generally considered unsatisfactory. Spraying with a copper preparation (Koperoxydule), 4 oz. per 10 gal. at the



rate of 12 gal./acre, has proved very successful. Dusting is still in the experimental stage but shows definite promise. A moderately heavy rain after spraying does not appear to impair its efficiency. There seems to be little danger of excessive copper residues in prepared tea. A number of fairly resistant clones have been observed and these are being multiplied by cuttings.

## 1045. VOLLEMA, J. S.

De landbouwkundige zijde der blister blight bestrijding. (The agricultural aspect of blister blight control.)

*Bergcultures*, 1951, 20: 235-6.

The dangers of a too drastic thinning of shade trees for control of blister blight are emphasized, and some moderate measures are indicated.

## Noted.

## 1046.

## a ANON.

The Australian sugar industry.

*Commerce, Sydney Chamber of Commerce*, 1950, 39: 401-2, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 146.

## b ANON.

La mécanisation de la culture de la canne à sucre. (Mechanization of sugar cane production.)

*Cahier Col. déc.*, 1950, pp. 447-9, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 146.

In Madagascar.

## c ANON.

Ceylon; Kakao. (Cacao culture in Ceylon.)

*Gordian*, 1950, 50: 1199: 49, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 23.

A survey, with export figures for 1930-50.

## d BEAUSOLEIL, J. E. J.

The development of the Gros Michel banana industry [in Trinidad].

*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 373-6.

## e BOISSART, P.

La culture de la canne à sucre et la sucrerie de canne à la Martinique. (The cultivation and refining of sugar cane in Martinique.)

*Rev. int. Prod. colon.*, 1951, 26: 256: 3, 5-6, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 110.

## f BONNET, E.

Situation actuelle de la sucrerie de canne à la Guadeloupe. (The present situation of the sugar industry in Guadeloupe.)

*Rev. int. Prod. colon.*, 1951, 26: 256: 19-21, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 110.

## g CARTER, W.

The feeding sequence of *Pseudococcus brevipes* (Ckl.) in relation to mealybug wilt of pineapples in Hawaii.

*Phytopathology*, 1951, 41: 769-80, bibl. 5.

## h COOLHAAS, C.

Indrukken betreffende de cacaocultuur in Brazilië, in Suriname en op Trinidad. (Some impressions of cacao production in Brazil, Suriname and Trinidad.)

*Bergcultures*, 1951, 20: 263-9, illus.

## i

COSTA, A. S., AND PENTEADO, M. P.

O milho como planta-teste para o vírus do mosaico da cana de açúcar. (Maize as a test plant for the mosaic virus of sugar cane.) [English summary 8 lines.]

*Bragantia*, 1950, 10: 93-9, bibl. 2, illus.

## j

EDEN, T.

The packing and despatch of specimens for examination.

*Pamphl. Tea Res. Inst. E. Afr.* 1, 1951, pp. 3. Special but not exclusive reference to tea plants.

## k

FERRAND, M.

La mécanisation de la culture du palmier à huile. (Mechanization of oil palm culture.)

*Cahiers Col. déc.*, 1950, pp. 420-1, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 148.

Mechanization is limited to reclamation work.

## l

GLOVER, P. E.

The root systems of some British Somaliland plants. III. Shrubs.

*E. Afr. agric. J.*, 1951, 16: 205-17, illus.

## m

DE LAGUARIGUE, M. L.

Le sucre à la Martinique. (Sugar in Martinique.)

*Rev. int. Prod. colon.*, 1951, 26: 256: 7, 9, 11-12, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 110.

Economic aspects of sugar cane production and rum manufacture.

## n

LEGRAND, D.

Mirtaceas de fruto comestible (sub-familia Myrtoideae) indígenas o cultivables en el Uruguay. (Members of the Myrtaceae with edible fruits (sub-family Myrtoideae) indigenous or adaptable to Uruguay.)

*Rev. Asoc. Ingen. agron. Montevideo*, 1950, 21: 88: 20-4, bibl. 1.

## o

LUCIE-SMITH, M. N.

The purpose and effects of mechanical tillage in orchard crops.

*Proc. agric. Soc. Trin. Tob.*, 1950, 50: 437-41.

Discussion with reference to such crops as coconuts and citrus.

## p

MARTIN, F.

L'avenir de la canne à sucre à la Réunion. (The future of the sugar industry in Réunion.)

*Rev. int. Prod. colon.*, 1951, 26: 256: 13-15, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 110.

With suggestions for improvement by irrigation, etc.

- q MAURITIUS.  
Sugarcane research in Mauritius during 1949.  
*Rev. agric. Maurice*, 1951, 30: 84-115, being a summary of the 20th A.R. Sugarcane Res. Stat. Mauritius, 1949 [see H.A., 21: 3122].
- r MONTOYA, D. G.  
Las horas diarias de luz solar y sus efectos sobre algunas plantas tropicales. (Daily hours of sunshine and their effect on some tropical plants.)  
*Rev. Agric., Puerto Rico*, 1949, 39: 181-4, bibl. 7, from abstr. in *Field Crop Abstr.*, 1950, Vol. 3, abstr. 333.
- s PLATONE, E.  
Dinámica del metabolismo de los taninos en almendras de cacao durante el beneficio. (The dynamics of tannin metabolism in cacao kernels during processing.)  
*Acta agron. Palmira*, 1951, 1: 121-31, bibl. 2.
- t PRATT, A. M.  
Coffee rehabilitation scheme. Planting.  
*Ext. Circ. Dep. Agric. Jamaica* 2 (revised), 1950, pp. 7, illus.
- u PRATT, A. M.  
Coffee rehabilitation scheme. Pruning.  
*Ext. Circ. Dep. Agric. Jamaica* 3 (revised), 1950, pp. 12, illus.
- v SCHULTES, R. E.  
La importancia de la taxonomía en el estudio de los cauchos "Hevea". (The importance of taxonomy in the study of hevea.)  
*Agric. trop. Bogotá*, 1951, 7: 2: 33-40, illus.
- w TOURNEUR, M.  
La production du café à Madagascar est-elle menacée ? (Is coffee production in Madagascar threatened ?)  
*Marchés colon. Monde*, 1950, 6: 2993-4, from abstr. in *DocumBl. trop. Prod. Amst.*, 1951, 6: 46.
- x VILANOVA M., T.  
Caficultura. De la almaciguera a la plantación. (Coffee cultivation. From the nursery to the plantation.)  
*Circ. agric. Minist. Agric. Ganad. El Salvador* 7, 1950, pp. 4.
- y VILANOVA M., T.  
Factores a considerar para una plantación ideal de café. (Factors in the successful cultivation of coffee.)  
*Circ. agric. Minist. Agric. Ganad. El Salvador* 29, 1951, pp. 4.
- z VOLLEMA, J. S.  
Hedendaagse cultuurtechnische problemen in de rubbercultuur. (Present day problems in rubber culture.)  
*Bergcultures*, 1951, 20: 257-61.  
Tapping, soil management, thinning and mechanization.

## NOTES ON BOOKS AND REPORTS.

## Books.

## 1047. ANGLO-AMERICAN COUNCIL OF PRODUCTIVITY.

**The hop industry. Productivity team report.** Report of a visit to the U.S.A. and Canada in 1950 of a productivity team representing the hop industry.

*Publ. Anglo-American Council on Productivity*, 1951, 21 Tothill St., London, S.W.1, pp. 113, illus., 9s. 6d. post free.

This is a report of a team which visited the U.S.A. and Canada to study the efficiency of American hop production methods and to make recommendations likely to help the efficiency of the English industry. Hop growing in America is described in detail and comparisons are made between the climatic conditions in U.S.A., Canada and England. A most valuable feature of this report is that in each chapter, describing picking, drying, baling, labour, production costs, and marketing, full comparisons are made between American and English practices, and descriptions of English methods are given when necessary. A concise summary and a list of recommendations are placed at the beginning of the report. Hops are grown in America on rich alluvial soils, but under varying climates. Yields are lower than in England except in the Yakima valley of Washington State. Late and early strains

of the Cluster variety are grown. This variety is suitable for machine-picking. Propagation is by suckers cut from the crowns. Wire trellising, which is lighter than in England, is commonly up to 20 ft. high, and has poles widely spaced. Two strings are used per hill to a single wire, either over the middle of the alley or over the line of hills. Cultivation is similar to that in England, but less manure is given. Cover cropping is common. Irrigation is essential in many valleys; Pest and disease control measures are regularly carried out. Hand picking (varieties Fuggles and Goldings) is only practised in the Willamette and lower Frazer Valleys of Oregon and British Columbia. Machine picking has now reached a high state of efficiency. In the recommendations made it is stressed that few American methods could be successfully employed without modification in England. Picking is considered to be the most important subject raised, and it is recommended that special consideration should be given to the type of picker and method of picking to be employed in England. Among other recommendations are: trial of winter cover crops, or summer covers sown in May and ploughed in before picking; irrigation on land tending to dry out in mid-summer; improved dusting machines and aerial applications of sprays and dusts; improvements in lay-outs, spacing, stringing and wirework for machine picking; breeding and selection of varieties suited to

machine picking. A useful list is given of books and occasional publications of interest to the hop grower on both sides of the Atlantic. C.W.S.H.

1048. BEWLEY, W. F., AND HARNETT, J.

*The cultivation of mushrooms.*

Anglo-Scottish Press, London, 3rd edition, 1951, 7½×5 in., pp. 104, illus., 6s.

There is plenty of information in this small book. The authors point out that mushroom growing can be carried out in many different buildings and situations such as floor beds in a shed, a special mushroom shed, an old building suitably lined, glasshouses, frames, caves and tunnels and ridge beds. Details are given of the special mushroom shed, where it is noted that attention must be paid to insulation, heating, ventilation, width of and space between beds, water supply and ready access to and from buildings to facilitate filling beds and removing spent compost. The preparation of compost from horse manure at different times of the year is considered. The preparation is described of flat beds, double small ridge and large single ridge beds with notes on their use. Details are given of spawning and casing, and the importance of the origin and treatment of the casing soil is stressed: it may indeed be the deciding factor determining yield. Routine care of the beds is explained. It is significant that almost one-quarter of the book is devoted to pests and diseases, some of them illustrated. At present the only satisfactory method of coping with them lies in the observance of a high standard of culture and hygiene. M.M.M.

1049. CHILEAN NITRATE EDUCATIONAL BUREAU, INC.

*Bibliography of the literature on the minor elements and their relation to plant and animal nutrition.*

Chilean Nitrate Educational Bureau, Inc., 120 Broadway, New York, 4th edition, Vol. I, 1948, pp. 1,037 [received 1950]; 4th edition, Vol. II, 1951, pp. 152.

Fourth edition, Volume I of this bibliography is the eleventh in the series, including seven supplements, which began with the publication of the first edition in 1935. It contains all material previously published together with some new material, and may be considered complete as of 30 June, 1947. The annotated references, i.e. abstracts, numbering approximately 10,000, are grouped under individual elements and are provided with author, element, animal nutrition and botanical indices. They are taken in the main from (American) *Chemical Abstracts*, *Experiment Station Record*, and (Commonwealth) *Soils and Fertilizers*.

Volume II contains 1,222 abstracts, covering 35 elements, obtained largely from *Chemical Abstracts* and *Soils and Fertilizers*. The usual indices are provided.

1050. ROYAL HORTICULTURAL SOCIETY (CHITTENDEN, F. J.).

*Dictionary of gardening.*

Oxford University Press, London, 1951, 11×8 in., 4 vols., pp. 2,316, £10 10s.

The revision of Nicholson's *Illustrated Gardeners' Dictionary*, undertaken by the Royal Horticultural

Society, is now complete after years of onerous and often tedious work, which, owing to wartime complications, largely devolved on one man, F. J. Chittenden, the editor. He unhappily did not live to see its publication. The Dictionary, according to the preface, has a distinguished ancestry, claiming descent, more or less direct, from John Parkinson's famous *Paradisus* of 1629.

In the design of the work Nicholson's original plan has not been altered. The plants are alphabetically arranged by genera and species with articles on horticultural operations and techniques inserted in their appropriate places. There is ample cross-reference. The number of species described has been enormously increased, as even a cursory comparison with the last edition will show. This is largely the result of the introduction of a multitude of hardy plants from eastern Asia through the prowess of a succession of dauntless collector-explorers, Forrest, Farrer and Kingdon Ward among them, whose singleness of purpose and determination in the face of every kind of obstacle have earned them the reverent gratitude of all whose pleasure is to cultivate, in the words of Parkinson, "all sorts of pleasant flowers that our English ayre will permit to be noursed up". Since this book has been long in the making, for reasons beyond control, it has not been possible to include species introduced after the type was set up, hence some quite recent names may be lacking. Apart from this a diligent check has not discovered the omission of any species which is or has ever been in cultivation, and it is to be imagined many are listed of which the acquisition for our gardens still remains in the regions of hope deferred. Technical and specialist articles abound and are excellent, as they should be, for the writers have been selected for their pre-eminence in their respective subjects and their names to those who know are impressive. Those who do not know and fail to recognize the identifying initials must look them up in Vol. I. That is to say that three times out of four they must put down one heavy volume to pick up another. The list should have been repeated in each volume, as has been done with the much lengthier list of abbreviations of book titles. But that is a small matter.

The horticultural articles contain all that is necessary to know to bring the crop discussed to perfection. Much of the advice has stood the test of time, though the results of recent research, at least up to 1945, have, where productive, been included. These four volumes are to be supplemented by a fifth which will be subject to revision and reissue. This, besides dealing with current plant introductions, will contain lists of recommended varieties of those garden plants which are constantly being improved by hybridization and selection (sniffily referred to by the élite as "florists' flowers") and summaries of improvements in pest and disease control. This excellent idea is likely to prove popular and will add greatly to the value of the work. The illustrations are entirely new line drawings made for the occasion, generally from the living plant, by well-known botanical artists. They are numerous and clear and their interest is enhanced by the many lesser-known plants depicted.

This work has not been issued as a new edition of Nicholson but, because of the many changes and additions and the number of articles on subjects



untouched by him that have been added, as an independent work with a new title—*The Royal Horticultural Society's Dictionary of Gardening*. It cannot fail to become the standard reference work on horticulture for many years, particularly if the promise of a recurring fifth volume is fulfilled. G.St.C.F.

1051. COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, AUSTRALIA.  
*The Australian environment*.  
C.S.I.R.O., Melbourne, 1949, 9½×6 in.,  
pp. 183, illus. [received 1951].

The handbook was prepared for the British Commonwealth Specialist Agricultural Conference on Plant and Animal Nutrition in Relation to Soil and Climatic Factors held in Australia in 1949. Soil, population, rainfall and other maps are a useful feature of the work. References to horticulture will be found in the chapter on Field Crops, and a clear skeleton outline is given of the organization of fruit and vegetable growing and of the cultivation of such crops as sugar cane and tobacco in the different States of Australia.

1052. CRANE, H. H.  
*Pansies and violas for exhibition and garden*.  
Collingridge, London, 1951, 7½×5 in.,  
pp. 101, bibl. 13, 8s. 6d.

As a guide to the cultivation of the pansy and viola this book could scarcely be bettered. Its arrival is opportune, for interest is again turning towards these plants, it is written by one who has devoted a lifetime to their study, it fills a gap in modern horticultural literature, previous works being long out of print, it is thorough and it is brief. The historical notes trace the development of the pansy from its origins in our wild *Violas tricolor* and *lutea*, collected and grown in thousands by Lord Gambier and his gardener Thompson at Iwer in 1813 and thereafter yearly improved by selection, to the show pansy of the Victorians with blotches and belting so exact that "they might have been drawn in Chinese ink by the most expert of draughtsmen". The show pansy, which never flowered freely, was hardly suitable for garden embellishment and has now given place to the bedding viola, unexcelled by any other plant for its massed colour effects and long flowering season. The viola springs, not from our British plants, as does the pansy, but from *Viola cornuta* of the Pyrenees with some assistance from *V. gracilis* of Greece. All too soon these pleasant evocations of "the good days" conclude and the reader is led firmly to the garden and kept there for the remainder of the book. Propagation is dealt with at some length, the most satisfactory method being by cuttings. Although the viola roots without difficulty, the amount of work here considered necessary to make a proper job of it will certainly rock the "stick 'em in and forget 'em" school. This chapter on cuttings deserves close attention. It is packed with useful hints and omits nothing. Propagation by seed is cheap and there is always the chance of an outstanding variety, but plants do not come true and in the main are of inferior types. A chapter on raising new varieties includes the technique of hand pollination. Other chapters discuss planting out, garden decoration and growing for exhibition. Violas and pansies can

be, but seldom are, assailed by any of six pests and five diseases, but these are all easily controlled and useful, as the author infers, in preventing the grower from getting slack. The illustrations, especially those showing the various types, ancient and modern, are excellent. G.St.C.F.

1053. CROOK, H. C.  
*Campanulas*.  
Country Life, London, 1951, 9×6 in.,  
pp. 256, bibl. 19, illus., 35s.

There has been no monograph on the Campanulaceae since that of de Candolle in 1830, and to obtain descriptions of the many species discovered since then entailed much search through the pages of scientific and horticultural journals. Thanks to Mr. Clifford Crook that is no longer necessary. A lifelong study of the genus *Campanula* has enabled him to describe every one, known or recorded, of the 300 or so distinct species into which botanists, not without acrimony, have attempted to divide the race. The book is conveniently arranged for reference. Brief preliminary chapters on cultivation are followed by a detailed alphabetical description, with suggested cultural treatment, of all the known species, whether in cultivation or not. This is an achievement that commands respect, the more so as Mr. Crook is able to write from personal knowledge of the majority and very rarely has had to depend on herbarium material. There follows a chapter in which are ranged those Campanulas not clearly determinable as distinct species. They fall naturally into groups around very distinct species and are so treated here. Hybrids have a chapter to themselves and it is one of particular interest to the gardener. In it is traced the parentage of most of the garden hybrids, many of quite recent origin, which are to be found in nursery catalogues, though in no great number, for *Campanula* seems to hybridize with difficulty. The book concludes with a list of synonyms, twenty-two pages of them! The 100 excellent photographs, the majority by the author, will prove a valuable asset, for they illustrate clearly every species commonly cultivated and many that are rarely seen. The book, with its felicitous blending of botany and horticulture, is a fine example of how such a monograph should be written. As a guide to the genus *Campanula* it has everything. G.St.C.F.

1054. DIGBY, M.  
*Agricultural co-operation in the Commonwealth*.  
Blackwell, Oxford, 1951, 8½×6 in., pp. 172,  
10s.

The word co-operation in this book is used in its narrower sense which we apply to the Co-operative Movement. In an appendix are given the number of Agricultural Co-operative Societies and of members and the value of business done in twenty-five Commonwealth countries.

1055. DUTCHER, R. A., JENSEN, C. O., AND ALTHOUSE, P. M.  
*Introduction to agricultural biochemistry*.  
John Wiley, N. York, Chapman & Hall,  
London, 1951, 8½×5½ in., pp. 502, 8s. 6d. or 48s.

This book is divided into three parts. In the first, following introductory chapters, short accounts are given of carbohydrates, lipids, proteins, enzymes and biological oxidation mechanisms. The second part is concerned with the plant, and deals first with seed germination, soil and fertilizers and then, in outline, with plant metabolism. There follow chapters on pesticides and what is termed "farm chemurgy," i.e. the use of farm products industrially other than as food. The third and largest section deals with animal nutrition and animal metabolism.

In short, in these three sections covering some 460 pages the authors have spanned biochemistry, plant physiology and animal physiology, directing attention to features of interest to the biochemist concerned with agriculture. It will be obvious that this feat could only be accomplished by the hop, skip and jump method. In consequence, the authors present an easy target for criticism to the specialist and to those convinced that one must plod slowly the steps to Parnassus. The book, however, is intended not for them, but for the eager student. Nevertheless, one wonders whether even he will not at times be somewhat breathless, for example, when, having hopped through an explanation of what is comprehended by the word oxidation in terms of atom and electron transfers, a skip and jump lands him three pages later into the intricacies of the intermediary steps in carbohydrate metabolism and of the Krebs cycle. The steady hand and wise counsel of a teacher will surely be needed here and in other such tight corners.

The authors deserve praise for their attempt to put the reader as rapidly as possible in touch with modern ideas and for the degree of coherence they have attained in covering such a wide variety of topics. Their sins are mainly of omission, and are, perhaps, not so much sins as sacrifices in the cause of brevity.

The book is not recommended to disciples of Dr. Gradus, but those who are prepared to skip the trees and get to the wood may find it useful. A.E.B.

1056. FRANCK, J., AND LOOMIS, W. E. (Editors).  
*Photosynthesis in plants.*

A monograph of the American Society of Plant Physiologists.

The Iowa State College Press, Ames, Iowa, 1949, reprinted 1950, 9×6 in., pp. 500, bibl. 149, \$7.00.

This very useful monograph is a well-documented statement of the present position of our knowledge and ignorance on photosynthesis and should be in every biological library. There are twenty-two articles, all written by leading authorities. Most deal with particular aspects of the subject; thus there are articles on photosynthesis under natural conditions, the products of photosynthesis, diffusion through multiperforate septa and the chloroplast, and several on the chloroplast pigments, the quantum requirements of photosynthesis, the interpretation of chlorophyll fluorescence phenomena and the use of tracer elements in the study of intermediate products. The articles vary from critical reviews to reports on recent research, which would be equally at home in a scientific journal. Collectively they provide a picture of the vast amount of careful and critical work that has been done in this field and the great difficulties encountered when interpretation

of the results is attempted. Thus the use of  $C^{14}$  tracer in attempts at identifying the intermediate compounds formed in the progressive hydrogenization of  $CO_2$  has shown—to use Loomis's words—"astonishing difficulties, and wide divergence in the views of the two main groups working on the problem". Most of the articles will probably be of interest mainly to the specialist: the non-specialist will be likely to find the first and the last the most rewarding. The first, by W. E. Loomis, is a very clear and concise review of the whole problem and summarizes much of what appears in the body of the book. The last, by C. B. van Niel, is a thoughtful and stimulating study of the problem from the viewpoint of Comparative Biochemistry.

M.C.V.

1057. VAN HALL, C. J. J., AND VAN DE KOPPEL, C.  
*De landbouw in de Indischen archipel. Deel IIB. Genotmiddelen en specerijen. Deel IIB. Industriële gewassen. Register. (Agriculture in the East Indies. Vol. IIB. Luxuries and spices. Vol. IIB. Industrial plants.)*

W. van Hoeve, The Hague, 1949, 9½×7 in., and 1950, 9½×7 in., pp. 784 and 756, references numerous, illus., fl. 22.50 each.

The first two parts of this comprehensive work, Vol. I and Vol. IIA, have already been reviewed [*H.A.*, 17: 1829 and 19: 286]. Vol. IIB first describes the cultivation of coffee, tea, tobacco, sirih or betel pepper (*Piper betle*), pinang or betel nuts (*Areca catechu*), and gambir (*Uncaria gambir*), and then deals less fully with pepper (*Piper nigrum*), nutmeg (*Myristica fragrans*), cloves (*Eugenia caryophyllata*), chillies (*Capsicum annuum*), ginger (*Zingiber officinalis*), turmeric (*Curcuma domestica*), cardamoms (*Amomum cardamomum* and *Elettaria cardamomum*), cinnamon (*Cinnamomum burmanni*) and vanilla (*Vanilla planifolia*). Vol. III takes in cotton (*Gossypium* spp.), kapok (*Ceiba pentandra*), sisal (*Agave sisalana*), cantala (*Agave cantala*), Manila hemp (*Musa textilis*), roselle (*Hibiscus sabdariffa*), ramie (*Boehmeria nivea*), rubber and guttapercha (*Hevea brasiliensis*), essential oils, tannins and dyes, castor oil (*Ricinus communis*), China woodoil (*Aleurites* spp.), benzoin (*Stryx benzoin*), sandal wood (*Santalum album*) and new plants brought into cultivation (pyrethrum, *Amorphophallus oncophyllus*, *Clausena anisata*, *Lonchocarpus*, and *Mundulea sericea*). As in the previous volumes the various crops are described by experts who give botanical and cultural details, and both books are lavishly illustrated. The complete work of four large books is an invaluable contribution to a knowledge of crops and cultivation in the tropics.

H.W.

1058. INTERNATIONAL UNION OF BIOLOGICAL SCIENCES.

*Trace elements in plant physiology.*

Chronica Botanica Co., Waltham, Mass., and Wm. Dawson & Sons Ltd., London (*Lotsya*, Vol. 3, I.U.B.S. Colloquia, Ser. B, No. 1), 1950, 9×6 in., pp. 144+10 plates, \$4.50.

This symposium, organized by the International Union of Biological Sciences at Rothamsted Experimental Station in 1947, gives a detailed picture of the recent

advances made in the study of trace elements in physiology and agriculture, a study which was forcibly stimulated by wartime conditions of crop production. The symposium contains 14 papers read by workers from western Europe, Great Britain and the U.S.A., together with some of the main points arising from the discussions. Papers by T. Wallace and E. J. Hewitt deal with the visual diagnosis of trace element problems and a large-scale method of sand culture for fundamental studies. D. I. Arnon draws attention to the experimental difficulties in proving the essentiality of trace elements in plant nutrition, and makes a proposal that the term "micro-nutrient element" should replace such terms as "trace element". Four papers (by E. G. Mulder, J. Lavollay, J. Erkama and H. Burström) are concerned with the function of trace elements in the metabolism of plants, and five papers (by L. Gisiger, F. Steenberg, M. Löhnis, D. Mulder, and E. A. Jamalainen) with trace element problems in crops which have arisen in European countries. [A few of the papers have been abstracted separately.]

1059. KELLEY, W. P.

*Alkali soils. Their formation, properties and reclamation.*

Reinhold Publishing Co., N. York, 1951, 9×6 in., pp. 176, bibl. 150, illus., 40s.

The author deals in turn with the origin of alkali soils, the effects of salts on soils, the soluble salts and exchangeable bases of such soils, their evolution, irrigation in relation to them, their relation to plant growth and finally their reclamation.

This monograph, in which the author makes full use of his own work in California and that of others elsewhere, is primarily intended for research workers and university teachers in soils and agronomy, and for irrigation, drainage and soil conservation experts in arid and semi-arid regions.

A consideration of underlying causes shows that mere draining and leaching will not necessarily convert an alkali into a normal soil. The chemical abnormality of alkali soils is twofold, consisting of an excess of soluble salts and/or exchangeable (adsorbed) Na. To remedy such conditions should be simple, but the difficulty lies firstly in the farmer's lack of knowledge of essential principles and secondly in the fact that the specific necessary technique varies from place to place. The author discusses the principles involved and makes suggestions on how to effect reclamation. D.A.

1060. KON, K.

*The original colour illustrations of new apple varieties [at Aomori, Japan], 1951, Aomori Apple Experiment Station, Japan, 14 coloured plates and descriptions in English.*

Mr. Kon gives intelligible notes in English on the parentage, history, tree habit, fruit and characteristics thereof of 14 apple varieties raised by selection from the hybrids, some 5,267 in all, of some 50 apple varieties. The breeding was under the direction of Mr. Susa, the former director. American varieties such as Delicious, Jonathan and others most often appear as parents. The 14 have been accepted by the Japanese Horticultural Society.

1061. KRÜSSMANN, G.

*Die Laubgehölze. (Broad-leaved shrubs and trees [found hardy in Germany].)*

Paul Parey, Berlin, 2nd edition, 1951, 10×7½ in., pp. 401, bibl. 43, illus., DM. 33.60.

There can be little doubt that the second, completely revised and enlarged edition of this comprehensive catalogue of broad-leaved shrubs and trees winter-hardy in Germany will be warmly received by nurserymen and gardeners in many countries as far as they are capable of mastering the little German necessary to understand the ever-recurring terms used in the 5,850 plant descriptions. The shrubs and trees are arranged in the alphabetical order of their scientific names which now conform to the international rules of nomenclature adopted in Stockholm in 1950, but an index of synonyms will be a crutch to lean on for anyone whose botany is not quite so up to date. Each genus is introduced with a brief, general characterization followed by descriptions of its species and—where appropriate—of its subspecies. Plants of proved horticultural value are designated by one to three asterisks and the degree of hardness is indicated by other symbols so far as observations warrant it. It is claimed that the number of botanical descriptions devoted to cultivated plants exceeds that in any other dendrological work. The 1,600 supporting line drawings—most of them from the author's pen—have been assembled on 60 plates. The assistance given by foreign experts—among them many British—in the compilation of this "practical dendrology" is courteously acknowledged. V.H.G.

1062. PRESTON, F. G.

*The greenhouse.*

Ward, Lock, London, 1951, 8½×6 in., pp. 640, illus., 42s.

"A greenhouse can be used for almost any kind of plant life." The book opens with this statement, and the author, who until recently was in charge of the Botanic Gardens at Cambridge, proceeds to prove it in more than 600 highly instructive pages, greenhouse here, being understood to include any glass structure from cold alpine house to tropical stove. Apart from the cultivation of ornamental plants the greenhouse can, of course, be used for propagation, forcing, storing and for the early stages of summer bedding. All these aspects are fully covered. The forcing of early vegetables and the growing of fruit under glass either in pots or border receives considerable attention. From brussels sprout to banana very little that is edible seems to have been omitted. Two-thirds of the book is taken up by an alphabetical list of ornamental greenhouse plants, with adequate notes on the propagation and cultivation of each. This section will repay study by those interested in little-known plants and their cultural requirements, for it seems improbable that anything so comprehensive has hitherto been published. In addition, certain groups such as cacti, orchids and ferns are given chapters to themselves. The construction, heating and general management of various types of glasshouse are sufficiently discussed. Failure to refer to certain recent horticultural developments gives the impression that the book may not be fully up to date. For instance, no mention is made of



the John Innes composts, long and short day plants, chrysanthemum mosaic, or of "meta" as a far safer and more deadly destroyer of slugs than the old-fashioned bran and Paris green, the mixture here recommended. The DDT preparations are given a hasty paragraph, the last in the book, as if the information had just come to hand. These omissions point rather to the book having been ready for the printers some time before the printers were ready for the book than to any inadvertence on the part of the author. They in no way detract from the value of a most competent, well written, well illustrated and beautifully produced volume. The blurb on the dust cover assures us that it cannot fail to become the standard work of reference, and though this statement is an integral part of most blurbs, horticultural ones at any rate, it requires a smaller dose of salt than usual to swallow it. G.St.C.F.

## 1063. PURSEGLOVE, J. W.

*Tobacco in Uganda.*

Government Printer, Entebbe, Uganda,  
1951, 10×6 in., pp. 70, bibl. 30, illus., 3s.

Tobacco of the species *N. tabacum* was grown in Uganda by Africans for domestic use long before the first Europeans arrived. The cultivation of Virginia type tobaccos for export started on a small scale in 1928 and since then there has been a rapid, and on the whole steady, expansion until 1946 when some 2½ million pounds were produced. To-day fire-, air- and flue-cured tobaccos and also varieties of *N. rustica* for nicotine production are all grown in the country. This book provides a practical and comprehensive guide to the cultivation of these various types, embracing, as it does, information on the history of tobacco cultivation in the colony, varieties, seed production and seedbeds, climate, soils, field operations, curing and grading, marketing, manufacturing and export, and pests and diseases. Information relating to trade in tobacco is supplied in tabular form in 19 appendices. Although the book is primarily concerned with, and of interest to Uganda, the author refers to experience in other countries, particularly in Africa, and this should widen its appeal. The text is easy to read, and the illustrations, most of which are excellent, include plans for the construction of a flue-curing barn and of the simple apparatus used locally for separating heavy from light seed.

## 1064. RUDLOFF, C. F., AND SCHANDERL, H.

Die Befruchtungsbiologie der Obstgewächse und ihre Anwendung in der Praxis.  
(The biology of fruit tree pollination and its practical application.)

Grundlagen u. Fortschritte im Garten- u. Weinbau, Eugen Ulmer, Stuttgart (at present at Ludwigsburg), 3rd edition, 1950, Heft 64, 8½×6 in., pp. 146, illus., DM. 4.40.

The authors, well qualified for their task by many years of research on the subject, present a great deal of practical information for the commercial and amateur fruit grower in a stimulating form. But the scientist is catered for as well; for in the nearly 60 pages of variety lists with glossaries and phenological data he will find information on top fruit pollination neatly assembled and brought up to date through three

editions. A final paragraph on nuts and two further chapters dealing with small fruits and with pollination by wind and bees complete the so-called special part, which is preceded by a more general biological introduction and followed by many practical hints. References to the literature are confined to papers written in German.

## 1065. RURAL BANK OF NEW SOUTH WALES.

*Australian rural industries. A graphical presentation.*

Rural Bank of N.S.W., Martin Place,  
Sydney, 1948, 8½×11 in., pp. 144 [received 1951].

In this valuable work, mainly in the form of graphs and maps, details will be found of rainfall, population and, among other items of interest, the distribution of horticultural and plantation crops throughout Australia.

## 1066. SATIADIREDDA, S.

*De teelt en het gebruik van Indonesische groenten en toekruiden.* (The cultivation and uses of Indonesian vegetables and herbs.)  
Landbouwbibliotheek voor Indonesie, J. B. Wolters, Groningen, Holland, and Djakarta, Indonesia, 1950, 9×6 in., pp. 192, bibl. 31, illus., fl. 4.50.

The native Indonesian vegetables are grown mainly in the lowlands of Indonesia below 700 m., either on irrigated land after the west monsoon paddy crop or on non-irrigated land at the beginning of the rainy season. European vegetables, on the other hand, are most successfully grown at altitudes above 1,000 m. and the seed is largely imported. This handbook, which incorporates results of recent investigations and trials, deals with the cultivation, utilization and food value of both types of vegetable. The first part gives a general account of the development of vegetable growing in Indonesia, areas of production, climatic and soil requirements, and principles of cultivation. The individual crops are then dealt with separately under 6 headings: leaf and stem vegetables, legumes, fruit vegetables, roots and tubers, herbs and spices, and plants used as vegetables but not grown specially for the purpose. This last group includes wild plants and some fruit trees and ornamentals. The cultural notes given for each crop are fairly detailed, though only in a few cases are good varieties recommended and in even fewer is pest and disease control mentioned. Of special interest are the notes on the preparation and uses, culinary and medicinal, of each plant and the table showing the food values of over 100 of these. These features make the book of value not only to the grower but also to the Indonesian housewife and to the connoisseur of eastern dishes. P.R.-D.

## 1067. STANER, P.

*Éléments d'horticulture congolaise.* (Horticultural plants of the Congo.)

Publ. Dir. Agric. Minist. Colon. Brussels, 1949, 9½×6 in., pp. 172, bibl. 15, illus., 60 fr. [received 1951].

This book will be of value not only as a catalogue of the vast number of ornamental plants cultivated in the Belgian Congo (about 500 genera are listed) but also as

a handbook for amateur gardeners, park superintendents and others who wish to make the best use of the resources at their disposal. The reader should not be put off by the rather vague, flowery approach of the short introductory section dealing with the principles of tropical gardening and the planning of pleasure grounds. The main body of the book is full of meat, concisely written and well ordered. It consists of an annotated list of the ornamental plants of the Congo including trees and grasses, arranged systematically under families. Each genus or species is briefly described with notes on its ornamental value, methods of propagation and cultural requirements. There is an index to genera and families. P.R.-D.

1068. STAPLEDON, SIR R. G.

*Farming and mechanized agriculture.*

Todd Reference Books Ltd., 49 Park Lane,  
London, W.1, 4th edition, 1950,  $8\frac{1}{2} \times 5\frac{1}{2}$  in.,  
pp. 407, 25s.

This is the complete agricultural reference book for the office so far as concerns the United Kingdom and the higher government agricultural organization in other parts of the British Commonwealth. In it are listed agricultural government officials, research stations and publications, both books, periodicals and occasional papers.

Statistics and tables will be found covering every sort of agricultural production in Great Britain, its acreage and production. The innumerable Committees and Societies associated with different branches of agricultural activity in Great Britain appear with their addresses, officers, and sometimes a note of their activities. It is briefly but adequately indexed. The functions of certain international bodies such as the Food and Agriculture Organization of the United Nations are set out.

It seems to one reviewer to answer every non-specialized question on agriculture which could reasonably be put to a long-suffering librarian. It can be recommended unreservedly to all librarians with an agricultural clientèle. D.A.

1069. SKOOG, F. (Editor).

*Plant growth substances.*

University of Wisconsin Press, Wisconsin,  
1951,  $9\frac{1}{2} \times 6$  in., pp. xiv+476, bibls., illus.,  
\$6.00.

It was altogether appropriate that the University of Wisconsin should celebrate its centenary with a symposium on plant growth substances, for not only have several early workers in the field, including Went, migrated from Europe to America, but it has been in the United States that much subsequent progress has been made. Furthermore, it should be recalled that in the foundation year itself Sachs, the German experimental botanist, was at the threshold of a brilliant career immortalized by the hypothesis of non-nutritive organ-forming substances which anticipated by some sixty years the actual proof of hormonal action.

The result is a book of thirty-nine essays grouped round eight broad aspects of the central theme; and though the great variety of special topics illustrates the diversity of growth substance effects, yet it is apparent that each contributor has endeavoured to assess his own interpretation of the whole. Herein

lies the book's most characteristic feature, for one can follow the evolution of the idea of hormone by the different responses it has invoked.

The first group of essays concerns growth substances themselves and includes contributions from Went, who surveys twenty years of hormone research since his original 1928 paper, from Haagen-Smit, one of the chemists who isolated auxin, Zimmerman, who has been involved in the synthesis of many hundreds of new growth substances, and Thimann, who has enquired closely into the relationships between chemical structure and physiological activity.

Recognizing the concern of auxin in all phases of metabolism and growth, Thimann exploits the idea that it acts as part of some enzymatic process shared by all cells, from the comparative effects of synthetic substances displaying a wide range of molecular configuration being able to elucidate the crucial structural qualities of molecules with physiological activity. By brilliant interpretation the action of auxin is disclosed as one of enzyme protection manifested through preferential adsorption over inhibiting substances, and the whole gambit of effects, from growth promotion to herbicidal action, is brought within the compass of a single metabolic mechanism.

The relationship between growth substance and metabolic process is examined in detail in the next group of essays, while in the third the emphasis passes to effects on whole tissues. In contrast comes the consideration of the practical uses of growth-regulating substances, typified by the contribution of van Overbeek who deals with tropical agriculture. van Overbeek makes out an excellent case for more fundamental work under tropical conditions, where physiological principles are often much more apparent in their operation. This is exemplified by studies of the effects of growth substances on the flowering and fruiting of the pineapple and on the rooting of cacao cuttings, in which completeness of auxin control with suitable regard to other factors must be the envy of workers in temperate latitudes where the apple may be cited as the epitome of refraction in attempts to control its development.

Under the heading "growth substances in vegetative development" comes one of the most fascinating groups of essays of the whole book. The plant in early growth is considered in its entirety in studies involving the artificial culture of embryos excised from their ovarian environment; in later growth attention is focused on stem and leaf. The leaf has two distinct developmental systems, that of the veins which, like stem growth, is clearly auxin controlled, and that of the mesophyll dominated, it would seem, by other growth factors. It is the balance between the two systems which gives the leaf its form, and accounts, too, for the effects of submergence in water, shade conditions and virus infection.

Developmental patterns have also been studied of isolated plant parts grown in tissue culture, and experiments are described here by White, whose name will always be associated with the technique, and by Skoog and Tsui in an exceedingly important contribution on bud formation. Skoog and Tsui recall Sachs' original concept of organ-forming substances, but differ from him in viewing the differentiation of parts as involving, not distinct substances, but "quantitative changes in amounts and interaction between nutrients

and growth factors" essential for the growth of all cells, with the pattern imposed by differential effects of synthesis, transport and local accumulation. They are thus in agreement with the unifying concept of Thimann already mentioned.

In the papers on reproductive development attention is drawn to the report of Roberts that it is possible to extract from plants when in flower, but not those still vegetative, a substance with direct flower-inducing properties as indicated on the cocklebur, a plant very sensitive to photoperiodic induction. The nature of this substance, the nearest approach to the hypothetical flowering hormone, has not yet been determined and further information will be awaited with extreme interest.

Finally there are essays devoted to the relation between growth substances and pathological growth, and to the role of vitamins and amino acids as growth factors. The main importance of this intriguing book lies in the multiple impression provided by it at a given moment of the far-reaching changes which are taking place as a result of the discovery of growth substances. The realization that this impression is first-hand from those responsible will be sufficient commendation to many. To the possibly timid non-specialist it can be recommended as most readable in all its parts. Nevertheless it is undoubtedly the research worker who will most appreciate this centenary project of the University of Wisconsin, and none more than the authors themselves. Many of their photographs appositely embellish the text. E.S.J.H.

1070. LE SUEUR, A. D. C.  
*Hedges, shelter belts and screens.*  
Country Life Ltd., London, 1951, 9×6 in.,  
pp. 128, illus., 15s.

This book is a most valuable contribution on a subject seldom tackled. It contains a wealth of information which is well presented in simple understandable language. Advice is given on the suitability of a range of shelter trees for various purposes, soils and positions, but a little more might have been said on providing temporary shelter for many of these subjects until established.

The chapters on hedging and the manual processes involved should prove invaluable to the farmer, and it is pleasing to note that the author includes excellent costings on this subject. He also gives his advice on the use of shelter belts and hedges to promote the well-being of both crops and livestock on the farm and horticultural holding, and deals with their beneficial effects on the ever present problem of soil erosion.

The zones of protection provided by various heights and widths of shelter belts and hedges are fully discussed, with information on the degree of protection provided by a wide range of subjects. Several references are made to the quick-growing Monterey Cypress (*Cupressus macrocarpa*) but it should be pointed out that the new hybrid, *C. leylandii* (*C. macrocarpa* × *C. nootkatensis*), is replacing this. In fairness to the author, however, he does note the disadvantages of *C. macrocarpa*.

In the chapter on coast screens and shelter belts for mild areas mention might have been made of subjects such as *Pittosporum crassifolium*, *Olearia traversi* and *O. forsteri*, even of the common elder and escallonias,

which are much used in coastal regions. Shelter belts and hedges of economic value that will bring in an income are sometimes planted by market gardeners, hardy varieties of fruit and such foliage plants as *Pittosporum tenuifolium* being also sometimes used in this way. A most informative chapter is provided on hedges, trees and the law. The book is splendidly illustrated and should find a place on the bookshelf of every agriculturist or horticulturist. H.W.A.

1071. TRITTON, S. M.

*Grape growing and winemaking.*

The Grey Owl Research Laboratories,  
Almondsbury, Glos., [1951 ?], pp. 32, illus.,  
5s.

This small manual should be invaluable to the man with a garden containing fruit or grapes which he would like to turn into palatable wine. The elements of vine growing are set out and are followed by the greater part of the book which is devoted to the production of wine of whatever type you fancy, whether from grapes or from currants, gooseberries, rhubarb, cherries, sloes, honey, raisins, dates and plums and several other sources. Notes are given on the English laws affecting the production of wine and a calendar of operations in vineyard and winery is provided. D.A.

1072. U.S. DEPARTMENT OF AGRICULTURE.

*Virus diseases and other disorders with viruslike symptoms of stone fruits in North America.*

U.S. Dep. Agric. *Agricultural Handbook*  
10, U.S. Govt Printing Office, Washington,  
D.C., 1951, 9×6 in., pp. 276, illus., bibl.  
322, \$2.30.

Although this book is a descendant of the 1942 *Handbook of Virus Diseases of Stone Fruits in North America*, it is quite unrecognizable in this new edition. Not only is it profusely illustrated with excellent black-and-white and colour photographs, but new sections are also included on non-transmissible maladies with virus-like symptoms, and on deficiency and toxicity symptoms that resemble virus diseases. The inclusion of these sections greatly enhances the practical value of the book to research and advisory workers. Virus diseases of peach and sweet cherry predominate, twenty of the former and fifteen of the latter being described, as contrasted with four of sour cherry and five of plum. One wonders to what extent this reflects the proportion of each crop grown in North America, or the degree of attention paid to each by pathologists, or the sensitivity of each species to damage by viruses. Since peach is the most sensitive species, it seems probable that some diseases first described on peach are really caused by viruses which are "indigenous" in plum and have spread relatively recently to peach. There is evidence that this is true of the phony peach disease. Although the viruses are grouped under the host in which they cause most damage, it is clear from the host range studies described in the text that it may be misleading to think of a particular virus as a peach or a cherry virus, when it is, in fact, a *Prunus* virus, not restricted to a particular species.

The literature on virus diseases of stone fruits in North America is now so extensive and is growing so rapidly that the compendium of information and bibliography



provided by this book is of great value to the newcomer in the field. The method of compilation by consultation between workers in different States is admirable and has undoubtedly reduced confusion arising from separate descriptions of the same diseases in different parts of the continent. Two general facts, one negative and one positive, emerge above all others in this book. The first is the lack of knowledge about the vectors of most of these viruses. It is true that some spread only by the use of infected scion wood, but others, like little cherry, spread rapidly in orchards. So far the identity of their vectors has been reported only for peach yellows, little peach, phony peach and peach X-disease. The second and positive fact is the remarkable degree of control achieved by roguing, followed by propagation from healthy trees, even after diseases have become firmly established. Until the end of the last century, when peach yellows was shown to be transmissible, this disease frequently threatened to wipe out the peach industry in the north-eastern States; now it is of minor importance. Phony peach has a similar though more recent history in Georgia, where over 1½ million infected trees have been cut out since 1929. When the next revision is made, we hope that space may be found, perhaps in an appendix, for an outline of the legislation passed in different States to prevent the propagation of infected stock. This is hinted at in the introduction—"Nurserymen need the assistance of research, regulatory and extension men and growers in obtaining virus-free scion wood and rootstocks and for establishing procedures to keep the growing nursery virus-free. Nursery improvement programs are under way in various States but vary in procedure and specifications." A knowledge of the regulations found to be effective and practicable in North America would be helpful to those concerned with virus control in countries with less experience of such diseases in tree crops. A.F.P.

## 1073. VAVILOV, N. I.

**The origin, variation, immunity and breeding of cultivated plants.** [Translated from Russian by Chester, K. S.]

*Chronica Botanica*, Waltham, Mass., and Wm. Dawson, London, Vol. 13, No. 1/6, 1949/50, 10 × 7 in., pp. 364, bibls., \$7.50.

This contribution to the thirteenth volume of *Chronica Botanica* comprises the selected writings of Professor N. I. Vavilov on the origin, variation, immunity and breeding of cultivated plants, translated from the Russian by Dr. K. Starr Chester. The work is in itself a volume of some 350 pages, generously illustrated and well furnished with tables and diagrams. Professor Vavilov is probably the best known to the Western world of that coterie of Soviet biologists whose achievements between the wars won universal recognition. Trained to a large extent in England under Bateson at Merton and Biffen at Cambridge, he represented at its most fruitful a combination of the Eastern and Western outlooks upon biological problems. When changing conditions in his own country presented him with increasing opportunities and resources it was largely under his leadership and inspiration that the now famous work of tracing the origins and evolution of cultivated plants was carried out.

Whatever Professor Vavilov has written within his own

chosen field cannot fail to command universal interest and respect. He has been admirably served in his translator whose performance in what cannot have been an easy task might well form a model for all such work. The opening essay on "Plant breeding as a science", while it does not tell us anything very new, contains much that is well worth saying and cannot very easily be said too often. It is, however, in the later essays on the "Phytogeographic basis of plant breeding" and the "Law of homologous series in the inheritance of variability", where Professor Vavilov is upon his own ground and reporting the fruits of his own unique experience, that his writings become of absorbing interest. The essay on the "Study of immunity of plants from infectious diseases", some sixty large pages long with fourteen pages of references, is a very competent performance which gives a comprehensive review of the subject. The latter half of the work is taken up by a study of the "Scientific basis of wheat breeding". It says much for the clarity and interest of this study that it was able to command the unflinching attention and comprehension of one whose work and interests lie in quite other fields.

This book can be confidently commended to all those interested in the less bizarre aspects of Russian biological thought. H.M.T.

## 1074. VAN DER VEER, K.

**De grote cultures van Indonesië. B. Kruidachtige gewassen. (The major crops of Indonesia. B. Herbaceous crops.)**

*Insulinde* 2, J. B. Wolters, Groningen, Holland, and Djakarta, Indonesia, 1950, 9 × 6 in., pp. 146, illus., fl. 3.25.

One of a series of handbooks on the people and industries of Indonesia, this pamphlet deals with the 6 principal herbaceous crops of the islands, rice, maize, sugar cane, tobacco, fibres (agave, manila hemp and roselle) and cassava. It will serve as a useful introduction to the history of the industries, the cultivation methods practised and the post-harvest treatment of the products. Although only a summary of the present position, it is an informative one liberally illustrated with well-chosen photographs and line drawings. P.R.-D.

## 1075. WEEVERS, T.

**Fifty years of plant physiology.**

Scheltema & Holkema's Boekhandel en Uitgeversmaatschappij N.V., Amsterdam, 1949, 10 × 6½ in., pp. xii + 308, bibls.

It was in 1895 that the author commenced his studies under Hugo de Vries at Amsterdam, and it was the master's own textbook of botany which provided both setting and model for his pupil and subsequent successor.

In one sense the procedure of tracing in turn the history of each main topic of de Vries has imposed a certain rigidity on the new presentation; for the streams of research have flowed with unequal intensity, some dwindling to a trickle, others broadening into mighty rivers fed by tributaries of later origin. In another sense it has helped to portray the composite whole of an experimental science which, while deriving from Renaissance times, did not experience its own renaissance until the achievements in the last century

of Sachs and his pupils, among them de Vries. So that as the young Weevers embarked on his own long career, a new chapter was opening in the annals of plant physiology.

The present century has in fact witnessed the "grand period of growth" of physiological investigation and of its accompanying literatures, now so extensive as to demand quite different qualities in the writer portraying it. Some method of sampling is essential, combined with a selection process discerning the more influential trends in new knowledge. Professor Weevers has realized a further need, that of giving emphasis to the work of Dutch and other European physiologists, which by publication in English is at once available to the greatest number of potential readers. However, the translation from the original, being somewhat literal, has managed to retain a distinctly Dutch flavour; nevertheless the reader quickly becomes used to the style, and to the infusion throughout the text of the author's own personal approach and outlook.

It is unexpected that the term "enzyme" should not be found in the book's subject index, for its fundamental significance to plant metabolism is obviously appreciated. Thus the process of respiration is cited by Professor Weevers as illustrating the great advances in physiological enquiry, which process has been analysed into many component chemical stages co-ordinated in the plant by a system of enzyme complexes. Then with respect to growth itself, which may be regarded as the outward expression of the internal mechanisms, the physiological scene has been transformed by the discovery of auxin, and the development of the hormonal concept, though the precise mechanisms of hormone action in the plant are not easily understood. Nevertheless, in noting the apparent link with the process of respiration, and so with the basic reactions of the cell protoplast, Professor Weevers is sensing the latest trends of enquiry towards a concept which takes full cognizance of the enzymatic role of the protein.

E.S.J.H.

### Reports.

(See also 690, 691.)

1076. AMSTERDAM. ROYAL INSTITUTE FOR THE TROPICS.  
*Veertigste Jaarverslag Koninklijk Instituut voor de Tropen (voorheen Koninklijke Vereeniging "Indisch Instituut")*, Amsterdam, 1950. (40th Annual Report of the Royal Institute for the Tropics (formerly the Royal Institute for the Indies), Amsterdam, 1950), 1951, pp. 63.

The new name of the Institute is indicative of the extended scope of its work, which now covers all tropical and sub-tropical regions and not, as formerly, only Indonesia, Suriname and the Dutch Antilles. This report contains brief accounts of the activities of the various departments. A fuller report of the work of the Tropical Products Department has been abstracted in *H.A.*, 21: 4104.

1077. BARBADOS.  
*Annual Report Department of Science and Agriculture, Barbados, 1949-50*, Bridgetown, pp. 74.

*Sugar cane breeding*: Details of crosses made and seedlings raised during the year are available in the Annual Report of the B.W.I. Central Sugar Cane Breeding Station. Brief notes are given on the performance of seedling varieties bred in previous years. B.41211 was the outstanding variety of the year, giving excellent results in every trial. *Manurial trial on cane*: In no case did phosphate application result in a significant yield increase in either cane, sugar, or sucrose percentage in juice. The effect of high nitrogen caused significant increase in yield of both cane and sugar in some cases and not others, but in many cases reduced the percentage sucrose. *Entomology*: Results of trials to control the cane root borer *Diaprepes abbreviatus* with Gammexane were inconclusive, and for the time being the old method of hand-collecting the adult beetles is recommended as a temporary measure. Two species of parasites, for the control of the cabbage and cauliflower pest *Pieris monuste*, were introduced through the Commonwealth Bureau of Biological Control.

1078. BARBADOS.

*16th Annual Report B.W.I. Central Sugar Cane Breeding Station, Barbados, for the year ending Sept. 30th 1949, [1951 ?]*, pp. 46.

Details of the crossing, selection and trial of sugar cane varieties are presented as in previous years. In the third year seedling plant cane trials the only variety of the B.45 series to show promise was B.45267; other promising varieties were B.41211, B.41227, B.4362, B.43337 and B.43391. In the third year seedling ratoon trials B.4425 and B.4466 showed promise under certain conditions, but B.44341 did not maintain its early promise shown as a plant cane. In the select seedling trials B.41211 was generally outstanding and B.41227 and B.43391 have also given good performances; these three varieties are now recommended for planting on a commercial scale in Barbados. The report also lists the seedlings despatched to the contributing colonies and supplies notes on the performance of seedlings distributed previously. In Barbados B.37161 accounted for 92.76% of the acreage in 1949, which is far too high a proportion in one variety for safety; B.4098 with 4% came next. In British Guiana the main varieties planted were B.34104, Co.421, D.14/34 and Diamond 10, the last named showing a considerable decline. In Trinidad B.34104 was the dominant variety in the 1948 crop, the other varieties showing most promise being B.37161, B.3337 and B.37172. In Jamaica the dominant variety is B.34104, but the incidence of mosaic, to which this variety is very susceptible though showing a high degree of tolerance, makes it desirable to continue the search for substitutes. The report also mentions a leaf-mottling symptom suggestive of mosaic disease in B.43391 in one plot in Barbados, but from the failure to transmit the trouble it is presumed that the symptoms were not the expression of a mosaic virus. Difficulties experienced in the inoculation of new varieties undergoing mosaic disease tests are described.

1079. BERMUDA.

*Report of the Bermuda Department of Agriculture for 1950, 1951*, pp. 46, plus Appendixes.

**Vegetables:** Results of first season's cropping of a 5-year manurial and costings trial show that plots receiving 4-12-6 gave the highest yield of potatoes, carrots and rutabaga, but farmyard manure gave the biggest cabbage crop. **Bananas:** Trials have been initiated to study banana problems including the "black tip" disease. **Citrus:** Both chemical and biological control measures were applied against scale insects.

1080. BIOLOGISCHE BUNDESANSTALT BRAUNSCHWEIG.

*Jahresbericht der Biologischen Bundesanstalt für Land- und Forstwirtschaft in Braunschweig, 1950. (Annual Report of the Biological Federal Institute for Agriculture and Forestry, Brunswick, 1950), 1951, pp. 48, illus.*

This is the second report of the Biologische Bundesanstalt. The organization has 13 institutes situated throughout western Germany at which investigations affecting horticultural crops included the following: **Physiological botany:** Breaking of dormancy in potato tubers. **Virus research:** Grafting trials with potato varieties to determine their resistance to virus-X; testing of potato varieties for latent virus infection; various leaf roll studies; the relationships between virus infection and potato variety and between aphid infestation and potato variety; biology and control of virus vector aphids; virus diseases of legumes. **Bacteriology and serology:** The effect of azotobacter-inoculum on cultivated plants; the resistance of German potato varieties to *Bacterium phytophthorum*; the influence of weather on the wildfire disease of tobacco; age resistance of potatoes to virus-X; a possible serological test of leaf roll virus. **Applied chemistry:** Chemical and physico-chemical diagnosis of plant viruses. **Resistance testing:** Potato scab testing. **Grain-, oilseed- and vegetable-cultivation:** Work described includes pest and disease control studies of vegetables and flowers. **Fruit and vegetable cultivation:** Pest control trials on fruit, vegetables and flowers; germination of apple seeds; trace elements for apple seedlings; the working mechanism of phosphoric ester preparations; trials of spray materials. **Root crops:** Various studies on nematodes; biology and mass alternation of virus vector aphids. **Colorado beetle research and control:** Overwintering, biology, natural enemies, birds as exterminators, BHC and DDT for control, improvement and reduction of cost of control measures. **Viticulture:** Relationship between weather and diseases of grape vine; trials of new chemicals; soil analyses.

1081. BRITISH COMMONWEALTH SCIENTIFIC OFFICIAL CONFERENCE.

*Proceedings Specialist Conference in Agriculture. Plant and animal nutrition in relation to soil and climatic factors, Australia, 1949, H.M.S.O., Kingsway, London, 1951, pp. 490, £1.*

The attention of readers is drawn to the papers and discussions in Sessions A and B, pp. 1-100 and 101-246, which are headed respectively, Present knowledge of the climatic and soil factors affecting nutrition of plants and animals, and The effects of specific soil and climatic factors on the nutrition of plants.

In particular in Session B the following papers and discussions will be found of interest.

T. Wallace [U.K.]. The diagnosis of the mineral status of plants, with special reference to deficiencies, excesses and interactions of nutrient elements.

H. O. Askew. Some aspects of boron deficiency in plants [vegetables and fruit in N.Z.].

C. G. Woodbridge. Boron in Canadian agriculture [vegetable and orchard crops].

I. S. Perold. Manganese and copper deficiencies in the south coastal region of South Africa [vegetables in Cape Flats].

R. D. Wilson. Molybdenum deficiency diseases of vegetable crops in the Central Coast area of New South Wales.

F. B. Johnston. Magnesium deficiency in Canadian crop production. [Tobacco, potato, apples. Abstract only, the original paper being in *Canad. Chem. Process. Ind.*, 1949, 33: 823.]

G. C. Orton. The influence of zinc on seed formation, berry development and yield in the Gordo Blanco grape [C.S.I.R.O. Res. Stat., Merbein].

K. C. Hammer. The influence of climatic factors on mineral and vitamin content of plants [California]. There are also three important papers by R. Hill of Cambridge, P. J. G. Mann of Rothamsted and J. F. Bonner of California on enzymes, and many others on other nutritional problems which indirectly concern horticulture.

1082. CENTRAL EXPERIMENTAL FARM, OTTAWA (GOODERHAM, C. B.).

*Progress Report, Bee Division, Central Experimental Farm, Ottawa, 1937-1948, 1950, pp. 45, illus.*

Although mainly of interest to beekeepers, this 10-year report contains the following items of interest to fruit growers: In an experiment at Ottawa, repeated over 6 years, overwintered colonies of average strength proved of greater value for pollinating apples than did 2-, 3-, or 5-lb. packages of bees imported from the southern U.S. In experiments in 1946 and 1947 normal DDT sprays on apples had little or no effect on bees working in the area, but in 1948 when parathion was used in place of DDT very heavy killing of bees occurred. Experimental work now in progress includes studies on the influence of external factors on nectar secretion and further investigations on spray poisoning of bees.

1083. CHESHUNT.

*36th Annual Report Cheshunt Experimental and Research Station for 1950, 1951, pp. 73, bibls., illus.*

Progress in a large number of experiments is reported. **Tomatoes.** 1. In an experiment to compare horse manure, milled seaweed and sodium alginate, the milled seaweed, as previously, had no effect on yields and this also applied to sodium alginate in contrast to previous results. 2. The omission of lime and phosphates from a tomato fertilizer had no effect on yield. 3. Plants raised in soil blocks and pots gave similar total yields, but the former cropped more heavily in the first month (June). 4. There was no difference in yield between plots sterilized by chloropicrin and steam. 5. In preliminary grafting experiments using 4 varieties as



rootstocks the yield of the scion variety, Potentate, varied according to the stock used. *Cucumbers*. 1. Excellent control of root-knot eelworm, *Heterodera marioni*, was obtained by first sterilizing the soil with steam and then injecting it with either chloropicrin or DD. 2. Slightly higher yields and a saving in the amount of horse manure used resulted from placing either 6-in. drainpipes or a core of brushwood in the centre of the beds. *Mushrooms*. 1. Whereas standard beds 7 in. deep yielded 1.5 lb. per sq. ft., beds 10 in. deep produced 2.72 lb. 2. The addition of 28 lb. castor meal per ton of manure increased the yield from 1.5 lb. to 1.94 lb. per sq. ft. 3. When mixtures of soil with stones, sand, peat or vermiculite were used for casing the beds, only mixtures of equal parts of stones and soil and of sand and soil respectively increased crop yields by comparison with the standard sterilized soil casing mixture. *Plant diseases*. 1. Investigations were continued on the effect of soil conditions on the growth and survival of *Didymella lycopersici*. 2. Investigations were also continued on the fungal flora of tomato roots both in steam-sterilized and unsteamed soil, but of 6 fungi isolated it would appear that only *Colletotrichum atramentarium* is actively parasitic. 3. A reduction in the spread of tomato (aubuca) mosaic was obtained by spraying with 1% tannic acid without affecting the taste of the fruit or the crop yield. Sulphonated lorol proved a useful wetting agent for this viricide. 4. Heat treatment reduced the virus content of tomato seeds infected with mosaic with little effect on the seed itself. 5. With arum lily corns heat treatment caused some destruction of spotted wilt virus but gave no control. 6. Watering the soil of potted tomato plants with malachite green reduced the symptoms of both tomato aubuca mosaic and potato virus X. *Entomological investigations*. 1. The appearance of the gladiolus thrips (*Taeniothrips simplex*) was recorded for the first time in England, and its habits, life history and control form the subject of a separate growers' note. 2. Studies on the toxicity of certain compounds to the red spider mite (*Tetranychus telarius*) were continued. *Chemical investigations*. 1. The results of studies on the nitrogen of some bone materials used in horticulture were published [see *J. Sci. Food Agric.*, 2: 125]. 2. Investigations on the production of ammonia and nitrate following steam sterilization of soil were continued. 3. The effects of deficiencies of B, Mn and K were studied in 14 varieties of chrysanthemum, and the symptoms are here described; the main conclusions are that the effects of any deficiency depend on the time the deficiency begins to operate in the life history of the plant and that any one deficiency is liable to produce different effects in different varieties. 4. Lime-induced chlorosis in glasshouse roses producing symptoms resembling Mn deficiency has not been corrected by spraying with manganese sulphate, but promising results have been obtained from soil applications of flowers of sulphur.

#### 1084. COLONIAL OFFICE.

Research work undertaken by Colonial Departments of Agriculture, Forestry and Veterinary services.  
*Colonial Research 1950-1951*, Cmd. 8303, [H.M.S.O., Lond., 6s. 6d.], 1951, pp. 154-70.  
Projects on plantation or horticultural crops briefly

noted include the following: In British Guiana sugar cane introductions and cultivation experiments. In Malaya the introduction of cacao, selection of oil palms, investigation of blister blight of tea. In Fiji biological control of banana and coconut pests. In Gold Coast wilt of coconuts, die-back in limes. In Kenya effect of soil moisture on coffee, different cultivation methods, pyrethrum breeding. In Mauritius sugar cane manuring. In Nigeria a cocoa soil survey. In Tanganyika selection of high-yielding coffee types, vegetative propagation of coffee and control of coffee pests and diseases, sisal cultivation methods. In Trinidad epidemic die-back in limes.

#### 1085. COLORADO.

*63rd Annual Report of the Colorado Agricultural Experiment Station, 1949-50*, 1950, pp. 59.

Stayman Winesap, Red Delicious and Gano apple varieties picked at temperatures as low as 25° F. were safely stored. It was possible to predict the harvest date of peaches within a 4-day error by the application of mean temperature records for March through July. Autumn spray applications were as effective as spring treatments in controlling peach aphid. A 5-year trial has shown that in no instance did a mild strain of peach mosaic develop into a severe strain. Parathion and methoxychlor were found significantly better than DDT in the control of cherry fruit worm. Harvest tests with onions indicated that storage-disease losses, due to purple blotch, can be reduced by earlier harvesting without decreasing the yield. Chemical dusts were not satisfactory against purple blotch on onions, but a spray with a good sticker applied at the rate of 125 gal. per acre gave good control. In fertilizer trials with potatoes, response in yield was due primarily to nitrogen and phosphate. Ten methods of potato vine destruction at two soil-moisture levels were tested. The control of potato insects, suspected of carrying viruses and toxins, was continued.

#### 1086. COMPAÑÍA CHILENA DE TABACOS.

*Tobacco Grading Plant and Experiment Station, Chagres. Report on Year's Work, Seasons 1948-49, 1949-50*, Valparaiso, pp. 18 and 47 tables.

*Suckering*. Suckering was again shown to accelerate ripening but had no significant effect on yield, though the results of a number of experiments suggested that suckering twice is likely to give the highest yield. *Length of time between topping and harvesting*. Harvesting 14 or 21 days after topping gave a higher yield than harvesting 28 days after topping, but this may have been due to the higher water content of the earlier harvested leaves. Early harvesting gives an inadequate degree of ripeness. *Priming*. Priming in two periods after the bottom leaves had been removed gave higher yields than harvesting all at once, and gave a more even degree of ripeness. *Time of topping*. Topping at the "tiny bud" and "early bloom" stages gave higher yields and earlier ripening than was obtained from tobacco harvested at the "full bloom" stage. *Varieties*. Cigar type No. 18 Wisconsin Seedleaf gave a higher yield than the larger variety No. 38 Habano Chagres owing, probably, to the larger number of plants per plot which it is possible to grow with this

variety. Of air-cured varieties No. 36 Paraguay Corriente is the standard variety, but No. 33 Little Orinoco yielded as well and is earlier and mosaic resistant. Breeding for mosaic resistance and earliness continued. C.W.S.H.

## 1087. CYPRUS.

*Annual Report Department of Agriculture, Cyprus, 1950, 1951, pp. 16, 2s.*

Among investigations mentioned are the following: *Citrus*: 2,4-D spraying reduced fruit drop and increased yields. Promising results were obtained with the spraying of "clensel" DDT bait spray against the mediterranean fruit fly (*Ceratitis capitata*). Single superphosphate and sulphate of ammonia increased orange and grapefruit yields. *Olives*: In a manurial trial no yield increases were obtained from superphosphate or sulphate of ammonia in the third or fourth year. A survey of olive pest incidence showed that *Dacus* and *Rhynchites* attacks varied with altitude and locality. *Grapes*: Yields were increased by sulphate of ammonia dressings, and by superphosphate provided the sulphate of ammonia was also applied. *Potatoes*: Precipitated bone phosphate gave as good results as superphosphate. C.W.S.H.

## 1088. CYPRUS [JONES, D. K.].

*Annual Report for 1950, Appendix V. Annual Report of the Agricultural Research Officer for 1950, 1951, pp. 16.*

Investigations reported: *Citrus*: 2,4-D spraying reduced fruit drop and led to an increase in yield of up to 25%. *Potatoes*: The use of a sprout inhibiting substance, though effective, was not economic. *Grapes*: Forage crops were grown successfully between the vines. A new large experiment will include a trial of intercropping. *Onions*: Selections for shape are being made from local types. C.W.S.H.

## 1089. CYPRUS [CORBETT, G.].

*Annual Report for 1950, Appendix VI. Annual Report of the Tobacco Officer for 1950, 1951, pp. 11.*

Investigations reported: *Yellow-leaf tobacco*: Varieties Souloak, Elsenberg Turk, Smyrna and Samsun gave higher yields than the local strain. Elsenberg Turk and Smyrna gave the best quality leaf. Further selections have been made of all varieties. *Burley tobacco*: Small trials of the varieties Green briar, Harrow velvet, Judy's prize and Kelley were planted to obtain seed for larger trials and to test these varieties under different conditions where irrigation was available. Growth was good, the plants producing an average of 14-16 harvestable leaves. The leaf from one station was of good quality despite lack of proper curing facilities. *Nicotiana rustica*: Seedlings of eight strains suffered severely from frost. Australian strains were superior to Indian. Nicotine content was low, there being a considerable loss during drying. C.W.S.H.

## 1090. CYPRUS [LOIZIDES, P. A.].

*Annual Report for 1950, Appendix VII. Annual Report of Agricultural Chemist for 1950, 1951, pp. 12.*

Investigations reported: *Potatoes*: Both 48% superphosphate and a 40% precipitated bone phosphate

(dicalcium phosphate) increased yields, and it was concluded that solubility in ammonium citrate is a satisfactory criterion for phosphoric acid availability in fertilizers under Cyprus conditions. Yields of potatoes following lucerne were increased by superphosphate and sulphate of ammonia. *Grapes*: Sulphate of ammonia increased yields, but slight increases due to superphosphate were not significant. In another trial on Cyprus black soil, fertilizers had no effect on yield in spite of the fact that leaves on plots receiving N were of a much deeper green than on other plots. *Citrus*: Superphosphate raised yields but sulphate of ammonia lowered yields in the absence, and raised yields in the presence, of superphosphate. Leaf analyses showed the effect of N dressings. *Olives*: Fertilizers have produced no significant responses and there is no evidence that they correct the irregular bearing habit of these trees. C.W.S.H.

## 1091. D.S.I.R., LONDON.

*Food Investigation 1949, being Report of the Food Investigation Board with the Report of the Director of Food Investigation for the year 1949, 1951, pp. 36, H.M. Stationery Office, Lond., 1s. 6d.*

Work in progress at the various stations and laboratories of the D.S.I.R. is reported. *Ditton Laboratory*: Contrary to expectation, ethylene is found in considerable quantities in the atmosphere of gas stores containing apples. This can be removed from the atmosphere by brominated charcoal, and ozone is now being tested for the same purpose. The rate of production of ethylene and other volatiles and their effects are being studied. Of the 21 varieties of dessert apples tested, Barnack Beauty, Belle de Boskoop, D'Arcy Spice, Tydeman's Late Orange and Winston have been selected for further trial on the basis of keeping quality and dessert quality after long-period storage. These dessert varieties, gathered late and stored in a post-climacteric condition, do not show any signs of low temperature injury when stored at temperatures below 4° C. Low temperature injury of Victoria plums and Bramley's Seedling apples has been studied. Experimental work on the skin coating of apples is being continued with promising results, but no completely satisfactory treatment can yet be recommended. The inclusion of phenyl mercuric chloride or iodine in the skin coating sprays has considerably reduced rotting during storage. Pentachlorophenol caused damage to the skin of the fruit and increased rotting. Trials have been made on the refrigerated storage of lettuce, broccoli, peas, cabbage and runner beans. Work is being done on the design of buildings and bins for the bulk storage of potatoes under cover. Fundamental studies on the physiological development of potato tubers were continued with a view to the prevention of sprouting in store, and the internal atmosphere of potatoes in store was studied. *Covent Garden Laboratory*: Experiments on the ripening of new varieties of bananas have been continued. A physiological injury to Jamaican limes has been investigated and recommendations made for transporting limes at 11.7° C. Experiments have been carried out on the storage of celery and Italian cauliflowers. It has been confirmed that ethylene has no significant effect on the speed of ripening of tomatoes.



An investigation on the use of moisture-retaining wraps for fruits and vegetables has been begun.

1092. D.S.I.R., N.Z.

*Twenty-fifth Annual Report of the Department of Scientific and Industrial Research, New Zealand, for 1950-51*, Wellington, 1951, pp. 80, 1s. 6d.

Among items of horticultural interest are the following: *Fruit research*: The use of hormones caused somewhat earlier ripening in outdoor tomatoes, but did not increase yields. Excessive applications were found detrimental. The sodium salt of 2,4-D applied to sweet oranges after pre-harvest dropping had started reduced loss by 63% without injuring the trees. Hormones failed to retard blossoming of Moorpark apricots and thus reduce frost risk. Callus formation was considerably stimulated by wound dressings incorporating hormones when applied after spring growth had begun. Manganese deficiency of peaches was controlled by spraying. A study is being made of the effect of East Malling stocks on fruit size and storage quality in the Sturmer apple. Only limited progress was made in the further search for a method of growing trees on their own roots. Stony-pit of pears was not transmissible to grafted scions of the Williams variety, thus confirming American experience. Irrigation immediately before frost did not appreciably raise air temperatures, and although continuous spraying of trees with water did help to protect a few dormant trees, it cannot be recommended because of the weight of ice formed. *Hop research*: Results of manurial trials indicated that 10 cwt. standard hop fertilizer was better than 5 cwt. In one case an application of 15 cwt. gave a still higher yield, while in another it appeared detrimental. In tests to control black root-rot, while no symptoms have appeared yet even on control plants, growth was better on plots treated before replanting with calcium cyanamide and was much better on plots treated with chloropicrin or D-D. In chemical tests aimed at disinfection of hop-crowns when opened up in the spring, improved growth of shoots followed the use of borax, common salt, or Cuprox, but damage resulted from copper-lime dust, Fermate dust, zinc oxide, or bordeaux mixture. *Tobacco research*: Work included seedbed investigations, fertilizer and variety trials, breeding and seed production, pest and disease investigations, chemical composition of leaves, and curing. *Cawthron Institute*. Part of the work mentioned under hop and tobacco research was carried out at the Institute. Other subjects investigated were: mineral status of hops, minor element status of celery and broccoli, boron deficiency of raspberries, zinc and copper deficiencies in apples, steam as a soil disinfectant, and the value of compost and cocoa-bean husks for glass-house soils. Fuller accounts of the work of this Institute are given in a separate Annual Report [see next number of H.A.].

1093. FLORIDA.

*Annual Report of Florida Agricultural Experiment Stations for year ending June 30, 1950*, pp. 263, illus.

This highly condensed report from Gainesville contains much of interest to horticulturists, particularly those in

the sub-tropics. It incorporates the reports of several substations and divisions, and the more important of the numerous papers dealing with individual projects have been abstracted separately under their appropriate headings. *Entomology*, pp. 65-70: The control of pests of pecan, woody ornamentals and tobacco. *Horticulture*, pp. 74-86: Work reported includes that on propagation, planting and fertilizing of tung trees; cultural requirements of the mu-oil tree (*Aleurites montana*); variety trials of minor fruits and ornamentals; relation of Zn and Mg to growth and reproduction in pecans; variety and irrigation trials with vegetables; culture and classification of camellias; and packing and ripening of tomatoes. *Plant Pathology*, pp. 87-92: Various diseases of horticultural crops and their control. *Federal State frost warning service*, pp. 109-11: Accuracy of forecasts and research. *Potato investigations laboratory*, pp. 112-17: Potato diseases; Alternaria leaf spot of cabbage and other crucifers; and vegetable variety trials. *Strawberry investigations laboratory*, pp. 118-19: Variety and fertilizer trials. *Vegetable crops laboratory*, pp. 120-37: Vegetable variety trials; breeding for combined resistance to diseases and insects in tomatoes; insecticidal value of DDT and related synthetic compounds on vegetables; organic fungicides for control of foliage diseases of vegetables; pests and diseases of gladiolus; control of nematodes; seedbed studies; and weed control. *Water-melon and grape investigation laboratory*, pp. 138-9: Control of fungous diseases of water-melon and fruit rots of grapes. *Central Florida Station*, pp. 140-5: Cercospora blight of celery; improvement of cultural practices with vegetables; breeding and variety trials; liquid fertilizers for vegetables; and pest control. *Citrus Station*, pp. 146-75: Nutrition studies; water relations of citrus; nature, causes and control of citrus decline; parasites and diseases of citrus insects; mechanical grove duster; citrus investigations in the coastal regions; and the processing of citrus products. *Everglades Station*, pp. 176-213: Soil fertility investigations under field and glasshouse conditions; vegetable pest control; soil and water studies; vegetable nutrition trials; cane breeding; fibre crop investigations; vegetable variety trials; grasses for lawns and other special purposes; vegetable viruses; nematode control; and weed control. *North Florida Station*, pp. 214-22: Tobacco investigations. *Sub-tropical Station*, pp. 230-49: Citrus and avocado culture studies; sub-tropical crops [mainly fruit] of minor economic importance; control of insects affecting sub-tropical fruits; mango selection, propagation and culture; potato and tomato fertilizer trials; and vegetable variety trials.

1094. HAWAIIAN SUGAR PLANTERS' ASSOCIATION.  
*Printed Reports of the 70th Annual Meeting of the Hawaiian Sugar Planters' Association including Report of the Experiment Station Committee for the year ending Sept. 30, 1950*, pp. 59, illus.

The report, despite its semi-popular form and lack of experimental data, contains information of interest on a large number of problems, amongst which are the following: *Cultural practices*. Work is in progress on the use of cane trash and bagasse to improve soil texture and fertility and to help to prevent erosion and



conserve moisture. Promising results have been obtained with Bouyoucos plaster of Paris and nylon blocks as sensitive means of recording soil moisture in the drier range approaching the plants' wilting point. Germination of setts was improved by irrigating on the day of planting. Single eye setts gave inferior results to the standard 3-eye setts. In spacing trials losses in cane and sugar occurred with row spacings greater than the standard 5-5½ ft.; double or "pineapple" row planting with the double rows spaced 18-20 in. apart in wide single furrows 5 ft. apart showed promise. Sub-soil applications of P, preferably just under the old stools, seemed to be the best placement to give an early response. Studies are also reported on the movement of radioactive P through cane plants, deterioration in certain cane soils, single v. split N applications, and K applied as sulphate and muriate. Experiments with night lights suggest that they will prevent tasseling, and a reduction in tasseling also followed spraying with sodium pentachlorophenate and maleic hydrazide. Studies have also been made on the best age to harvest cane, and on the use of chemicals to hasten ripening, but with discouraging results. In further work on crop logging it has been found that leaf punch N may be influenced markedly by climatic factors. *Diseases.* Studies are reported on the reaction of Hawaiian canes to Fiji disease, on new fungicides for treating cane cuttings and on the further successful use of hot water treatment against chlorotic streak. *Machinery.* The one-line cutter-windrower used successfully for harvesting cane on level, unirrigated land has been modified to work on furrowed land where it handles up to 40 tons of cane per hour. Aluminium flumes have proved satisfactory for transporting harvested cane by water on a large scale. *Varieties.* The breeding programme is summarized and notes are supplied on 8 varieties, comparisons being drawn with the standard variety 37-1933. *Weather.* The weather forecasting service is outlined and a study of the effect of temperature on germination and growth is described. *Weed control.* A new formulation combining CADE SSA and 2,4-D has been prepared in a central mixing plant; it remains stable in solution and can be distributed for use as required either as a pre-emergence or contact spray. Trials with pellets containing 2,4-D have given promising results. New herbicides undergoing field trials include sodium ethyl sulphate of 2,4-D, sodium TCA, maleic hydrazide, phenyl mercuric acetate (PMA), dichloral urea and boracax. Trials are also mentioned on the control of specific weeds, the tracing of radioactive 2,4-D through plants, and the development of new lightweight spray tanks. The symptoms of 2,4-D injury to canes is described and illustrated. *Miscellaneous.* Using radioactive CO<sub>2</sub> more information has been gained on the movement of food within the cane plant. A new rat poison, Warfarin (Compound 42) has proved very effective in cage and field trials.

#### 1095. HORTICULTURAL EDUCATION ASSOCIATION.

*Scientific Horticulture 1950-51*, 1951, Vol. 10, pp. 240. Gibbs & Sons, Orange St., Canterbury, England, 10s. 6d.

The delay in publication of this volume does not appreciably detract from the value of its articles. Horticulture Overseas is prominent in three articles on Horticulture in New Zealand, Horticultural Education

in Holland, and Horticultural Research in Holland. Research work in the United Kingdom described concerns turf research at St. Ives, plant propagation at (1) Kew and (2) Wisley, the National Institute of Agricultural Engineering at Wrest Park, frost protection experiments at Wisley, meteorological contacts with horticulture, raspberry growing and research in Scotland, plant breeding in vegetable seed production and the work of the Mushroom Research Association at Yaxley. Three articles are devoted to soils and soil problems. The remainder deal with different phases of practical horticulture such as market gardening and French gardening in the Lothians, bulbs in Lincolnshire and flower production in the south-west of England. Most of these articles, which are written by persons who really know their subject, should be a godsend to the practical man and a help to the horticultural adviser far beyond the confines of these islands. D.A.

#### 1096. INDIAN TEA ASSOCIATION.

*Proceedings of the 8th Annual Conference of the Indian Tea Association, Tocklai, December 1950*, 1951, pp. 47.

The conference was addressed on, and discussed, the following subjects: Recent experiments in tea manufacture, the present position with regard to modernization and mechanization of the tea industry both in the field and in the factory with particular reference to the Tull report, the interrelationships between manuring and shade in tea, and progress in the control of pests and diseases.

#### 1097. INDORE.

*Progress Report Institute of Plant Industry, Indore, for the year ending 31st May, 1949*, 1950, pp. 64.

Although primarily devoted to cotton and field crops this report mentions trials with potatoes and sugar cane. In a manurial trial on sugar cane, the final results of which await statistical analysis, there were indications of increasing yields of both cane and sugar as N top dressings were increased up to 150 lb. per acre on top of a basic organic dressing containing 50 lb. N. In a low-yielding variety trial the old varieties Co.419, Co.421, Co.312 and Co.213 outyielded four newer varieties Co.527, Co.443, Co.428 and Co.413.

#### 1098. I.N.E.A.C.

*Rapport annuel pour l'exercice 1950. (Report of the work of the I.N.E.A.C. stations, 1950.)* Institut national pour l'étude agronomique du Congo belge, Brussels, 1951, pp. 392, 160 fr.

The following items are taken from the report of the Central Research Station, Yangambi. *Plant Physiology:* Mineral nutrition of oil palms and cacao was studied. With oil palms, the number of leaves was little affected by the nature of the soil and fertilizer treatment, but the development of the stipe and colour of the leaves was affected. The importance of balanced applications of fertilizer and regular irrigation in the nursery was shown. *Plant Pathology and Entomology:* Damage caused to Robusta coffee by lead arsenate sprays was found to be due to the arsenic, not the lead. Strain L 150 was damaged by concentrations below 1.2%, but strains and individuals

within the strains varied in susceptibility. Treatment of oil palm seeds with 1% Certosan, an organic mercurial, for control of bacterial rot did not affect germination of the seeds. *Helminthosporium heveae* on hevea was not controlled by Cuprosyl, copper oxychloride, Fermate or colloidal sulphur. Studies on fusarium wilt of oil palms and coffee continued. Studies on the biology of the cacao collar borer (*Glenaea fasciata*) showed that plants were only attacked when there was a high degree of moisture at soil level; for control, a concentrated DDT spray gave promising results. Good control of coffee moth (*Dichocrocis crocodora*) was obtained with parathion, arsenicals and wettable DDT. 90-6% control of *Antestia bechuana* on coffee was obtained with Gesarol dusted at the rate of 13 kg. per ha. Trials were carried out on the control of *Heterodera marioni* in tobacco soils, tobacco aphids and potato coccids. *Oil palms*: Selection work. Trials have shown that intercropping with perennial plants, especially a rice/peanut rotation or bananas, has a favourable and persistent effect on yield. *Hevea*: Selection work. Spacing trials showed that the production potential was highest with the closest spacing (750 trees per ha. thinned to 350). Trials of grafting methods and observations on the relative susceptibility of clones to brown bast and wind breakage are reported. *Coffee and cacao*: Selection work. During the first 3 years of production multiple stem coffee trees yielded more than single stem trees, but in the fourth year the single stem trees took the lead. Of the coffee shade trees tested, *Macaranga heudelotii*, *Phyllanthus discoideus* and *Croton mubango* developed best. Coffee cuttings, 20 cm. long, taken from the tips of gourmand shoots and planted in sand in Trinidad I.C.T.A. frames, rooted satisfactorily. Other work reported includes studies of the floral biology of coffee, observations on fusarium wilt of coffee, and trials on the spacing, shading and propagation of cacao. *Agricultural mechanization*: A new Division of Agricultural Mechanization has been established. Reports are also made from the various sub-stations.

1099. INTERNATIONAL SOCIETY OF SUGAR CANE TECHNOLOGISTS.  
*Proceedings of the I.S.S.C.T. 7th Congress, August and September 1950*, Executive Cttee, Brisbane, Qd, 1951, pp. 795, illus.

The editor is to be congratulated on this attractively produced publication in which appear more than 80 papers by leading authorities in Australia, Hawaii, S. Africa, India, the West Indies, Mauritius, the Philippines and elsewhere. About one-third of them concern processing, 13 are entomological, 10 pathological, 6 concern breeding and the rest cultural problems, including mechanization. Among cultural subjects dealt with are the following: Effects of phosphorus deficiency and excess, flowering and pollen fertility, use of herbicides, trends of research in Queensland, foliar diagnosis, varietal deterioration, photo-periodic effects, varieties resistant to cane borer, fungicidal seed treatments, effect of molasses and sweet sorghum residues on soil structure, irrigation in Natal and Zululand, mechanization in S. Africa, improvement in portable apparatus for weighing sugar cane, the development of the Fairymead cane harvester.

1100. TEA RESEARCH INSTITUTE OF EAST AFRICA.  
*Annual Report of the Tea Research Institute of East Africa, 1950, 1951*, pp. 13.

This report consists first of an account of the establishment of this Institute near Kericho in Kenya; secondly of details of the advisory work in connexion with dieback and pests and diseases; and thirdly of the programme of research work which it is proposed to put in hand. A survey showed that, in contrast to Ceylon, dieback can occur at high elevations after pruning and is accompanied by carbohydrate deficiency in the roots. This is thought to be due to an even crop distribution and the prevalence of hard plucking. Recommendations have been made for the control of root splitting disease (*Armillaria mellea*) and the eelworm *Heterodera marioni*. Gammexane dusting has proved successful in controlling leaf-eating weevils and beetles.

C.W.S.H.

1101. JAMAICA.  
*Annual Report of the Department of Agriculture Jamaica, 1948-9, 1950*, pp. 18, 1s. 3d.

Among investigations mentioned are the following: *Bananas*: Effect on sucker production of goose-necking, spacing, nitrogen applications, and removal of young suckers. A Lacatan banana spacing trial. Testing new strains for resistance to Panama disease and determining the effect of fertilizers on the incidence of Panama disease in Gros Michel bananas. *Coconuts*: Spacing trial, investigations into the "unknown disease". *Citrus*: Management trial which included the folding of poultry in the orchards. The control of epiphytes with Methoxone. *Cocoa*: Propagation trials. Trials on potatoes, tobacco, cashew nuts, avocado pears and mangoes are also mentioned. [For Bulletin on 1948/49 investigations, see *H.A.*, 21: 2164.]

C.W.S.H.

1102. JAMAICA.  
*Annual Report of the Department of Agriculture Jamaica, 1949-50, 1951*, pp. 18, 1s.

Among investigations mentioned are the following: *Bananas*: Multiplication and testing in the field and storage of new varieties resistant to Panama disease and Leaf Spot disease. Vegetative propagation of Lacatan bananas. *Coconuts*: Spacing trial, investigations into the spread of an "unknown disease" in the Western area. Trials on citrus fruit, coffee, tomatoes, mangoes, cashew nuts, melons, cocoa propagation and potato eelworm (*Heterodera marioni*) attack are briefly mentioned.

C.W.S.H.

1103. KENYA.  
*Annual Report of Kenya Department of Agriculture for 1949*, Vol. I and II, 1951, pp. 29 and 89, sh. 1/50 and 4/50 respectively.

This report is published in two parts, Vol. I, Part I dealing with general information relating to agriculture, Part II with policy and work of the department, while Vol. II gives accounts of investigations submitted by heads of sections. Experimental work of horticultural interest includes: *Entomology*: A collection of parasites was made for the control of fruit flies in the Hawaiian Islands. The banana weevil, *Cosmopolites sordidus*, was for the first time recorded in Kenya. Attempts were made to control the mealy bug, *Pseudococcus brevipes*, and the scale, *Diaspis bromeliae*.

attacking pineapples. *Plant pathology*: The occurrence of virus diseases of plum and apple has been confirmed. Various other diseases of deciduous fruit, vegetables and ornamentals are noted. *Plant breeding*: Variety trials included pyrethrum and sunflower. *Coffee*: The leaf miner, *Leucoptera coffeella*, caused serious defoliation which was most probably the result of seasonal interference with its natural enemies and was certainly not associated with the application of any insecticide. *Antestia* damaged coffee in many districts and its control with BHC is being tried. The non-copper fungicides used last year were again effective in reducing leaf fall. From studies conducted on onion taint it is concluded that prolonged contact with water, as in underwater fermentation, increases onion flavour, but even with normal fermentation it may be produced in coffee which is inherently prone to it. *Horticulture*: Apple rootstock trials, nutritional studies and soft fruit investigations were among the projects undertaken by the section. It is recommended that growers oil-spray all plums, apples and pears every year to break prolonged dormancy. Sowing dates are given for a number of vegetables. *Pyrethrum*: The effect of bud disease on pyrethrin content appears to be much stronger than on total yield. A significant correlation was found between altitude and pyrethrin content. While a previous trial had shown that pyrethrum seed germinated better at a comparatively low temperature, in a second trial pre-germination chilling significantly reduced the germination percentage. *Sisal*: Plots with the most plants gave the highest yields. A dieback of the leaf tips was noted which, it is suggested, may be due to mineral deficiency.

## 1104. LUDINGTON.

*Report of the Luddington Experimental Horticultural Station for 1950, 1951*, pp. 30, illus.

Luddington is one of the Experimental Horticulture stations set up as a link between horticultural research and advisory and demonstration work in the U.K. It was established in the west Midlands in 1949 and will be mainly concerned with experiments in fruit-growing and vegetable growing, intensive Dutch light work and to some extent flower growing. In this first annual report its aims are stated and brief accounts are given of short term trials already completed on various vegetables and flowers. Further trials in progress on lettuce, cabbage, dahlia and cut flower problems are also listed.

## 1105. MADRAS.

*Administration Reports of Subordinate Officers of the Department of Agriculture, Madras, for 1948-49*. Superintendent Government Press, Madras, 1951, pp. 455.

Among reports containing information of particular interest to horticulturists are the following: *Report of the Oilseeds Specialist*. Mention is made of a scheme whereby 160,000 seedling coconuts are to be produced annually for distribution to growers. This has necessitated the establishment of coconut nurseries at eight Agricultural Research Stations. Work on the multiplication of improved strains of gingelly continued, the aim being short growing season, high oil

content and white colour in seed. Work on the coconut was mainly on cultural and manurial practice and included green manure trials and burial of coconut husks and leaves between rows. Other tests concerned depth of planting, watering, rhinoceros beetle. Work on cashew nut concerned manuring and methods of vegetative propagation. *Report of the Fruit Specialist*. Mango work indicates that to get maximum cropping different varieties must be propagated in different ways. Work continues on citrus rootstocks at Kodur, where a site of 15½ acres has been set aside for the purpose. Bananas will be investigated at Aduthurai. For apple growing in the hills Merton 778 stock is recommended. The disadvantages of lack of cold can be obviated by spraying with 3% linseed oil emulsion in winter. Plum rootstock trials are reported. *Report of the Sugar Cane Specialist*. Work indicated the superiority of one late maturing and one midseason cane, that the application of phosphate did not influence yield or quality of jaggery, that differences in irrigation methods did not affect yields. Chemical, physiological, mycological and entomological notes are also given of routine progress. *Report of the Tobacco Exploratory Research Station at Cuddalore*. Work proceeds on cultivation practice, including soil and water conservation by contour banding.

## 1106. MALAYA (WILSHAW, R. G. H.).

*Annual Report of the Federation of Malaya Department of Agriculture for 1948, 1949*, pp. 79, 4s. 8d. [received 1951].

Slightly more than half this report is devoted to the Research Branch of the Department of Agriculture, but the arrangement under seven separate Divisions does not lend itself to the easy extraction of information on particular crops. Among the crops mentioned are, in alphabetical order: *Areanuts*. A study of the yield potentialities of selections. *Brazil nuts*. Yield records. *Cacao*. A shade trial area was established and propagation trials started. The most serious pest of cacao is a squirrel, *Callosciurus* sp. The worst insect pest, *Helopeltis theobromae*, was checked by dusting with Agrocide III at 12 lb. per acre applied every 2 months. The only important disease at present affecting mature cacao in Malaya is red-root disease (*Ganoderma pseudoferreum*). *Cloves*. Work on the control of pests. *Coffee*. The effects of pre-war mulching were still clearly visible; in 1947 the untreated plots, then in a poor condition, were mulched and by the following year a marked improvement had occurred, the leaves in most cases changing from yellowish to dark green. A shade and variety experiment was laid down. *Derris*. Re-selection work on varieties was completed, and an experiment on methods of establishment is in progress. Methods of controlling a severe leaf disease of Changi 3 (*Colletotrichum* sp.) are being investigated. *Fibres*. A new varietal trial with Manila hemp was started. A collection of ramie clones is being made and manurial and spacing experiments are being carried out on this crop. *Fruits*. Clonal yield trials have been laid down with rambutans and durians. *Oil palms*. Work has been carried out on selection, the age at which seedlings are planted out, mechanical inter-row cultivation, methods of felling and disposal, methods of applying phosphatic manures, analyses of carotene and oil contents, leaf analyses and



studies on leaf spot diseases of seedlings and young palms. In an unreplicated trial the yield over 2 years of trees established from 1- and 2-year-old seedlings was double that of trees established from 3-year-old seedlings. Numerous leaf analyses from adjacent healthy and unhealthy palms failed to establish any consistent difference in the proportion of mineral nutrients. Leaf analyses also failed to establish any clear correlation between fruiting cycle and leaf composition. In leaf samples taken from 5 estates on 3 soil types there was very little variation in N and P but wide variations in K, Ca and Mg. *Pineapples*. The disease known as fruit collapse is being studied. *Rubber*. Investigations on rubber seeds as a possible source of drying oil have shown that seeds should be collected at least once a week and that the moisture content must be reduced to about 6% to prevent mould growth. *Tea*. Work has been done or is in progress on selection, vegetative propagation, the optimum level of N manuring, mechanical plucking, methods of weeding, dusting trials with DDT against *Helopeltis* spp. and methods of controlling red-root disease (*Ganoderma pseudoferreum*). *Vegetables*. The nature of bacterial rots in cabbages raised from slips and methods of controlling them were studied. *Weed control*. An experiment was started on the mechanical eradication ofalang. Preliminary trials have been carried out with selective herbicides against a number of weeds including *Mimosa pudica*, *Cyperus rotundus* and water-hyacinth.

#### 1107. INTERNATIONAL CONFERENCE ON MUSHROOM SCIENCE.

*Proceedings of the first international conference on scientific aspects of mushroom growing*, issued as *Mushroom Science* No. 1, obtainable from the Mushroom Experimental Station, Yaxley, Peterborough, England, 1951, pp. 111, 7s. 6d.

The more important of the short separate articles reproduced in this report were abstracted in *H.A.*, 1951, Vol. 21, No. 2.

#### 1108. NORTH CAROLINA.

*Research and Farming*, Vol. 8, No. 4, being 72nd Annual Report N. Carolina Agricultural Experiment Station 1949, 1950, pp. 68, illus.

*Tree fruits*: Summer sprays of DDT and/or parathion gave good control of peach tree borers, plum curculio and scale insects on peaches; fumigation or manure applied to old peach soils appeared to be beneficial to young, newly planted trees. *Small fruits*: Results of trials with radioactive phosphate on vines indicate that fertilizers will be more effectively used when distributed in a band about 3 ft. wide under trellises than when broadcast over the vineyard. The pollination of perfect-flowered grape varieties was not affected by adverse weather. Parathion and TEPP controlled strawberry mites. *Vegetables*: Pelleted seed improved lettuce stand; drench applications of Dithane Z-78, Fermate and Tersan gave good control of lettuce mildew. Dithane Z-78 and Parzate sprays checked anthracnose on lima beans. Tribasic copper sulphate controlled late blight on tomatoes. New, late blight resistant potato varieties are listed. It was found that

dates of planting and harvest had little effect on the vitamin content of sweet potatoes, while shading improved that of turnip greens. Chloropicrin and dichloropropane-dichloropropene mixture were very effective against meadow nematodes in soils growing sweet corn. *Bulbs*: Leaf scorch on narcissus was eradicated by steeping infected bulbs in formalin for 4 hours. *Tobacco*: Mineral oil alone showed far greater promise in controlling sucker growth of both burley and flue-cured varieties than any other compound so far tested. Pigment and sugar changes during curing were studied. In variety trials Bottom Special and 402 were the most outstanding. Soil fumigation with methyl bromide in the early spring controlled weeds and black shank and reduced rootknot in seedbeds. Fertilizer placed in two bands 6 in. apart and 4 in. deep produced the highest yields and values.

#### 1109. NYASALAND PROTECTORATE.

*Report of the Department of Agriculture Nyasaland for 1949, Parts I and II.*

Zomba, 1951, pp. 19 and 23, 2s. 6d. each.

*Part I*.—General. Acreage, yield and export figures are given for the principal crops including tung, tea and tobacco.

*Part II*.—Experimental work. *Tung*: The superiority of buddings, particularly those on *Aleurites montana*, over seedlings was again confirmed. In clonal trials, ZM13 on *montana* stock gave the highest yields. Results of cover crop and fertilizer experiments in progress are reported. The die-back of tung trees caused by *Botryosphaeria* sp. became an important problem in 1949 and is being studied. *Tea*: No significant differences in yield were recorded from the 4 different treatments applied to old China Jat after down-pruning nor from the 6 different tipping levels and pruning methods applied. Hand-plucking gave significantly higher yields per acre than did machine-plucking. The results of different methods of bringing young tea into bearing did not vary significantly. Clean pruning was superior to cut-across treatments on Indian Jat. *Tobacco*: In a fertilizer trial the effect of N was highly significant. Pests and diseases attacking tung, tea, tobacco and coffee are recorded.

#### 1110. NYASALAND PROTECTORATE.

*Report of the Department of Agriculture Nyasaland for 1950, Part I.*

Zomba, 1951, pp. 28, 2s. 6d.

General information about the work of the Department with notes on the activities of the Experimental Stations to be reported in detail in Part II. Acreage, yield and export figures are published as in previous years.

#### 1111. JANNE, E. E.

*Ohio Nurseryman's Association Research Program. Summary of the 1948-1949 Program*, [1950 ?], pp. 17.

Seven experiments are described. 1. *Cold storage of dormant hybrid-tea roses*. Plants were kept in storage at 28°-30° F., 32° F., 35°-37° F. or 42°-45° F. from 15 December to 30 May or 30 June. Plants stored at 32° and 35° F. gave the best subsequent performance. Plants stored at 42°-45° F. showed inferior initial growth and appearance, but gave as good flower production. The experiment also suggested the desirability of



increasing the temperature gradually before planting out and of potting the plants and holding them in frames rather than planting direct into the garden. 2. *Quick freezing dormant rose plants.* Quick freezing to 0° F. for 2 days followed by storage at 28°-30° F. had no ill effects on the plants, but where subsequent storage was at 20°-25° F. all the plants died. 3. *Pruning of hybrid-tea roses prior to cold storage.* Cutting back plants to 10 in. above the bud union before storage gave better results than cutting back to 6 in. or 8 in. or than no pruning. Cutting back to 5-6 in. after storage and before planting out did not reduce flower production. 4. *Preservatives for burlap used to wrap balled nursery stock.* Of 10 compounds tested only 2, Cuprinol 30 Green and Kopex 117 Green, both containing copper naphthanate, proved effective. 5. *The retention of basal leaves in potted chrysanthemums.* In the absence of adequate spacing, fungicides were not effective in preventing the loss of basal leaves. 6. *Media for heeling-in nursery stock and plunging potted plants.* Eighteen media were compared for 7 plants. No one medium proved best for every type of plant, but media consisting of sphagnum peat and sand, Michigan peat and sand, bank sand and rotted sawdust were generally satisfactory. Fresh wood products were unsatisfactory. 7. *Materials used in constructing beds and frames.* A trial is in progress in which beds constructed in 10 different ways and wood treated with 8 different preservatives are being compared.

## 1112. PENNSYLVANIA.

*Science for the Farmer, being 64th Annual Report of the Pennsylvania Agricultural Experiment Station for the year ending 30th June 1951, pp. 64, illus., issued as Bull. Pa agric. Exp. Stat. 540.*

*Floriculture:* Variety trials are reported. Dithiono aerosols proved effective in some cases against parathion-resistant red spider mites; pyrophosphoramide aerosols also killed the resistant mites except on the older leaves. *Mushroom growing:* Pest and disease control studies were continued. A very satisfactory compost made of hay and corn cobs has been developed and a method of composting horse manure with the minimum of handling and loss of weight has been worked out. *Orcharding:* It has been found possible to measure the gloss of apples by a gloss meter such as is used in the ceramics industry. Lead arsenate, parathion, EPN 300 and methoxychlor all gave satisfactory control of cherry fruit fly. An oil-type spreader increased the efficiency of DDT sprays against grape berry moth. A new species of leafhopper, *Erythroneura coxi*, was found on raspberry plants; biological observations are reported. *Potatoes:* The new variety 2×J-1 has proved to be consistently high yielding, of good quality, resistant to leaf roll and immune to the field strain of late blight. A study was made of factors affecting mechanical injury during harvesting. *Tobacco:* Very heavy applications of potash were beneficial to yield and quality, the highest yields being obtained with 500 lb. K<sub>2</sub>O per acre. New wildfire-resistant lines are proving satisfactory. Parathion gave good control of Green June beetle larvae in the seedbed. *Vegetable growing:* Chemical weed control experiments are reported in asparagus, lima beans and spinach. A yellows-resistant strain of Penn

State Ballhead cabbage is to be released. The removal of the heads of seed lettuce resulted in the production of lateral stems which gave a good crop of seed. Mercuric compounds were only toxic to insect eggs in an alkaline soil.

## 1113. ROYAL HORTICULTURAL SOCIETY.

*The fruit year book 1951-2, No. 5.*  
Roy. hort. Soc. Lond., 1951, 9½×6 in., pp. 141, illus., 15s.

Readers of the *Fruit Year Book* have come to expect from this publication a mental repast of nourishing but stimulatingly varied fare, appetizingly served and tastefully garnished. They will not be disappointed in this fifth number. There is much to interest those concerned with any of the various aspects of fruit-growing. Some of the more specialized articles, such as those on rootstocks for apples and pears in America, a new method of pruning and training cordon apple trees, and French methods of grafting walnuts, have been abstracted separately. Others, of particular interest to amateurs, include "An amateur's fruit garden on chalk", "Some observations on fruit growing in private gardens", and notes on the cultivation of figs in the open, gooseberries and medlars. The problems of brown rot and codling moth are clearly and simply dealt with. Northern growers will profit from the critical survey of "Fruit growing in the northern counties", and for plant breeders there is a review of "Apple breeding in Canada", and a report of a discussion on "The breeding of varieties of fruit" by Reid, Grubb, Spinks and Wood. There is also an interesting account of the Fruit Group's excursion to the Viticultural Research Station at Oxted, Surrey. As for the garnishing, one coloured plate of a cherry orchard in spring is outstandingly beautiful. Many of the articles are of an introductory nature only, but serve to rouse the reader's interest, and some of the opinions expressed are provocative. As from a good meal, one comes away with room for more. P.R.-D.

## 1114. SARAWAK.

*Annual Report of Sarawak Department of Agriculture for 1950, pp. 47 [mimeo.].*

Among crops other than padi now noted as being cultivated are rubber, sago, pepper, cocoa, roselle (*Hibiscus sabdariffa*).

## 1115. SMITHFIELD, ONT. [BLAIR, D. S.].

*Progress Report, 1944-1948, Experimental Substation Smithfield, Ontario, pp. 7, illus.*

This area comprising 100 acres was established under the Division of Horticulture in 1944. The three soil types occurring represent a large portion of the orchard soils of Durham and Northumberland counties of Ontario. Of 50 acres allotted to fruit 35 have been allotted to long-term apple trials dealing with orchard management problems such as contour planting, rootstock and hardy tree building, and varieties. Some 5,000 apple and 6,000 raspberry hybrids from Ottawa are under observation, together with 3 of the rust-resistant black currants introduced by the Division. Twenty acres are under vegetable canning trials. These include rotation plots using peas, corn and tomatoes as cash crops, fertilizer application methods with tomatoes, blossom end rot control in tomatoes



chemical weed control in peas and sweet corn, spacing trials with corn and tomatoes; tomato transplant studies and pea, corn and tomato variety trials; potato variety trials. Reports are given here on sweet corn variety trials and sweet corn spacing trials, pea and tomato variety trials and tomato fertilizer application trials.

1116. STE CLOTHILDE, QUE. [BROWNE, F. S.]. *Progress Report 1936-1948, Experimental Substation for mucklands, Ste Clothilde*, Quebec, 1951, pp. 19.

Considerable progress has been made on the 21 acres cleared towards determining the varying amounts of fertilizers which will give the best results on muck soils for the following vegetables: lettuce, spinach, carrots, onions, potatoes, cabbage, and celery. The necessity of providing such elements as boron, copper and manganese for particular crops is also realized and provision is made. An apple variety orchard and a small pear orchard have also been started. In the former various frame builders are being tested, Antonovka and Virginia Crab so far proving the most satisfactory. In the pear orchard hardy varieties and frame builders are under trial.

1117. ST. VINCENT. *Annual Report on the Agricultural Department, 1949*, 1951, Govt. Printer, Kingstown, St. Vincent, pp. 40.

*Arrowroot*. In a varietal and method of planting experiment the Banana variety outyielded the Creole variety in the first two reappings. In the milling trial a granite-edged runner mill was able to deal with a greater volume of roots than a saw-tooth mill, though the starch recovery from the latter was slightly higher. *Sweet potatoes*. Varieties Harry and B.29 are the highest yielding. Optimum yield is obtained at 5 months with nearly all varieties tested. *Sugar cane*. In a factorial experiment varieties B.34104 and B.37161 were superior to BH 10/12, while responses to 700 lb./acre sulphate of ammonia and 400 lb./acre superphosphate were significant. C.W.S.H.

1118. TUNISIE, SERVICE BOTANIQUE ET AGRONOMIQUE [S.B.A.T.]. *Rapport sur les travaux de recherche effectués en 1949. (Report on investigations made in 1949.)* Bull. Serv. bot. Tunis 19, 1950, pp. 88.

Reports are presented from the several laboratories of the S.B.A.T. and the École Coloniale d'Agriculture de Tunis (E.C.A.T.), of which the following are of horticultural interest: *Vegetable Laboratory*. Selection of tomato and tobacco varieties continues; hormone spraying of outdoor tomatoes to produce seedless fruit did not give satisfactory results; a rapid colorimetric method for determining the germination capacity of vegetable seeds is evaluated. *Agricultural Laboratory*. Weed control experiments on *Oxalis cernua* and cyperus are reported. *Agricultural Entomology Station*. Work was continued on control of *Ceratitis* and of a microlepidopterous pest of globe artichokes. *Fruit Laboratory*. Hybridization of apricots and methods of propagating the pistache. *Laboratory of Agricultural Technology*. E.C.A.T. A refractometer was used to

determine the percentage of oil in olives. Two semi-mechanical pieces of apparatus for harvesting olives were tested. *Botanical Laboratory*. E.C.A.T. The resistance of the principal vine rootstocks to lime-induced chlorosis and salinity was determined, and the effect of the physical characters of the soil on the performance of grafted and direct-producer vines was studied. The wine quality of a number of grape varieties was determined.

1119. ONTARIO DEPARTMENT OF AGRICULTURE [VINELAND]. *Report of the Horticultural Experiment Station [Vineland] for 1949 and 1950*, [undated, received 1951], pp. 70, illus.

In the Research section of this biennial report some of the investigations are reported in detail; these have been abstracted separately. Other activities, reported more briefly, include the establishment of a new Horticultural Products Laboratory to investigate problems of fruit storage and processing, work on fruit and vegetable breeding (an account of the sweet pepper and apple breeding being given in some detail), and observations on the use of chemicals in weed control.

1120. WAGENINGEN, INSTITUUT VOOR TUINBOUW-TECHNIEK. *Jaarverslag Instituut voor Tuinbouwtechniek, Wageningen, 1950. (Annual Report of the Wageningen Institute of Horticultural Technology, 1950)*, pp. 47, illus.

Thirty-three experiments on the use of horticultural machinery and materials are reported. The following are some of the results obtained. (1) A glasshouse with iron sashbars is warmer during the day and cooler in the mornings and evenings than one with concrete sashbars; at night there is no difference. One with wooden sashbars is also warmer during the day than one with concrete, and warmer during the morning, day and evening than one with iron sashbars. Dutch light houses are warmer than any of the other three except at midday when wooden houses are the warmest. The light intensity is greatest in Dutch light and iron houses. (2) A comparison of the value of different glass materials for use in frames showed that Isoflex on glass, Thermolux, Isoflex and Windolite were better insulators than normal glass but did not let through as much light, whereas Verre Trempé and Perspex let through almost as much light but were no better insulators. (3) The growth of lettuces in clay pots was outstandingly better than that in any of 4 types of cardboard pot. (4) Semi-waterproof paper covering beans, tomatoes and potatoes in the field gave protection from a night frost when the temperature did not fall below  $-2^{\circ}$  C. (5) The use of small diameter ( $1\frac{1}{4}$  in. or  $\frac{3}{4}$  in.) pipes for glasshouse heating has proved very economical commercially. (6) Of 3 materials tested as a soil covering during steam sterilization, a jute mattress filled with flax chaff gave the best insulation, slagwool was less good and sailcloth gave practically no insulation. (7) Electrical heating with both low and high voltage was found suitable for forcing chichory. (8) Of 10 wound dressings tested on apple trees, Cambinol, Askola, Shell-Entpasta and Proxyl resulted in the best healing and caused no burning. When painted on the buds the first material caused the least



damage. (9) Applying fertilizer in solution by overhead irrigation resulted in better yields of spinach and carrots than applying it dry to the soil, several small applications being better than one large one. The results with lettuce were very variable.

## 1121. WELLESBOURNE.

*First Annual Report of the National Vegetable Research Station, Wellesbourne, Warwick, Oct. 1949-Sept. 1950*, 1951, pp. 6.

A foreword by the chairman, F. T. Brooks of Cambridge, enumerates the difficulties of organization, staff, land and equipment in the first year. The station (the N.V.R.S.) and its sub-station at Paglesham, Essex, were established as a company limited by guarantee and without share capital with registered offices at Wellesbourne and with the title of The British Society for the Promotion of Vegetable Research. The properties are leased to the company by the Ministry of Agriculture. At Wellesbourne there are 280 acres of level land, all except 13 acres of alluvium being arable land at an elevation of 150 feet. At Paglesham there are 150 acres and they will be primarily used for multiplication of stocks of vegetable seed bred at the main station or elsewhere. The graduate staff consists of 2 plant breeders, 2 entomologists, 2 physiologists, 1 chemist, 1 statistician and 1 watercress expert in addition to assistants and the director. The director, Dr. J. Philp, briefly reviews work reported more fully in separate articles in the report, referring to projects as follows: Growing brussels sprouts from hybrid seed; breeding of other brassicas and onions; control of pea moth in accordance with date of emergence, which itself depends on temperature; pea aphid control; carrot fly control; physiological problems of lettuce and garden beet which concern seed production; long term manurial experiments with vegetables; depressed yields in watercress beds.

### New Periodicals.

## 1122. DOMUS PLANTARUM, URUGUAY AND ARGENTINA.

*Phyton*, Montevideo (Uruguay), Vicente Lopez, Buenos Aires (Argentina), 1951, No. 1, pp. 45, £1 p.a.

The sub-title of this new biannual publication is *International Journal of Experimental Botany*. It is the intention of the editors to publish original papers on experimental botany, particularly physiology, ecology, anatomy and cytology, from all parts of the world, the contributions being in Spanish, English, Portuguese or French with a Spanish summary. In the first number all the articles are in Spanish and are provided with English summaries. It is to be hoped that this attempt to promote botanical studies in Latin America by international exchange of experimental results will encourage similar enterprises in other countries.

1123.

*The New Zealand Gardener*, 1951, Vol. 8, No. 1, pp. 80, P.O. Box 6002, Te Aro, Wellington, N.Z., 13s. a volume, or 1s. 1d. a number.

This journal now incorporates the Journal of the Royal New Zealand Institute of Horticulture. While primarily catering, it would appear, for the New Zealand amateur, it is pleasantly produced and should do much to stimulate the embellishment of a countryside which has climatic advantages unknown to the Englishman in the Old Country. We cannot believe that as horticulture comes into its own it will remain so slender.

### Noted.

1124.

a BRITISH COLUMBIA, DEPARTMENT OF AGRICULTURE.

*Climate of British Columbia. Tables of temperature, precipitation and sunshine. Report for 1950*, 1951, pp. 24.

b CANTERBURY AGRICULTURAL COLLEGE.

*Annual Review Canterbury Agricultural College for year ending 30th June, 1951*, Lincoln, New Zealand, 1951, pp. 77, illus.

c GOLD COAST.

*The Annual Report of the Department of Agriculture of the Gold Coast for the year 1949-50*, 1951, Govt Printer, Accra, pp. 13, 2s.

d MISSOURI.

*60th Annual Report Missouri Agricultural Experiment Station 1947-1948*, being Bull. 528, pp. 71, illus. [received 1951].

e NORTHERN IRELAND.

*Twelfth General Report of the Ministry of Agriculture, Government of Northern Ireland*, being Cmd 295, H.M.S.O. Belfast, 1951, pp. 150, 4s. 6d. Covers period 1934-1950.

f NORTHERN RHODESIA.

*Annual Report of the Department of Agriculture Northern Rhodesia for 1950*, Lusaka, 1951, pp. 19.

g UGANDA.

*Annual Report of the Department of Agriculture Uganda for 1949*, 1951, pp. 45, 2s. [See also *H.A.*, 21: 3137.]

h U.S. DEPARTMENT OF AGRICULTURE, EXTENSION SERVICE AND OFFICE OF FOREIGN AGRICULTURAL RELATIONS.

*Conference report on extension experiences around the world*, Washington, D.C., 16-20 May, 1949, 1951, pp. 208, bibl. 11.